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RESTORATION OF THE FUNCTIONAL CAPACITY OF THE STOMACH WHEN DEPRIVED OF ITS MAIN ARTERIAL BLOOD SUPPLY*

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ALTHOUGH the central theme of this address is the reaction of the stomach to the diminution of its arterial blood supply, it will deal not only with gastric physiology and pathology but also with the effect of obstruction of the circulation in other organs, namely, in the heart and the brain. There are several reasons for this widening of the scope of the lecture. The present address is given in connection with the anniversary of the untimely death of Dr. Louis Gross. His chief interest, especially in the last years of his life, was the elaboration of a method for increasing the blood supply to the heart. One of his last publications was an extremely important study of the effect of coronary sinus ligation on the blood supply to the heart in the dog.[1] Gross and his co-workers established the important fact that a complete, or, even better, a partial occlusion of the coronary sinus enriches the coronary vascular bed to such an extent that it prevents altogether or else greatly minimizes the formation of a myocardial infarct after a sudden and complete occlusion of the anterior descending branch of the left coronary artery. The ultimate aim of their experimental investigation was to devise a surgical method for the improvement of the coronary arterial circulation in a diseased human heart. But a lasting improvement of restricted circulation can only be achieved through the development of collateral circulation. This is exactly what we ourselves have observed when most of the gastric arteries had been ligated.

Thus there is a definite relationship between Gross's work and our own. Moreover, one of our co-workers in the Department of Physiology, Dr. M. Fauteux, who was greatly impressed by Gross's communication, found a simpler method for improving the coronary circulation, *i.e.*, by ligation of the vena magna cordis. He based his procedure on experimental work performed on dogs, and later applied it to patients with disturbances of the coronary circulation.

METHODS OF IMPROVING COLLATERAL CIRCULATION

The main conception of Fauteux[2] was that there is a great similarity between the arteriosclerotic diseases of the coronary blood vessels and those of the blood vessels of the extremities. For this reason, he believed, it is justifiable to apply to the heart the surgical methods which have proved useful in the treatment of vascular diseases of the extremities. It seems that Professor W. A. Oppel,[3] one of my senior colleagues at the Military-Medical Academy in St. Petersburg, was the first surgeon to employ ligation of the popliteal vein in the treatment of senile gangrene of the foot, and he obtained very satisfactory results. The beneficial effect of venous ligation in the case of experimental or pathological occlusion of an artery in an extremity was presumably due to the rise of the arterial and venous blood pressures in the vascular bed below the arterial and venous obstruction and to the development of collateral circulation.

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The work of Oppel and other surgeons who followed his lead gave Dr. Fauteux the idea of applying this method to the heart. In his experiments on dogs Fauteux found that occlusion and partial resection of the anterior descending branch of the left coronary artery (otherwise the left ramus descendens) at a high level generally resulted in the death of his animals a very short time after the operation. However, if the vena magna cordis was ligated immediately before the arteriectomy, the dogs survived the operation indefinitely. The same results were obtained when the vena magna cordis had been ligated one year before the coronary arteriectomy was performed. The preliminary ligation of the vena magna cordis greatly improved the blood supply to the region of the heart irrigated by the left ramus descendens. Immediately after the occlusion of the vena magna cordis all its branches below the ligature were dilated with blood and the anterior aspect of the heart acquired a bluish colour. When, in addition, the left ramus descendens was ligated, the peripheral branches of the artery below the occlusion did not remain empty, as they would have done if the vein had not been obstructed, but were filled with blood.

Post-mortem examination of the hearts of dogs operated on showed that in many cases there was no apparent lesion of the myocardium, although in some animals an infarct was formed with subsequent development of scar tissue.

The experiments of Dr. Fauteux are not only of importance to the cardiologist but have a more general interest as well. Whereas the occlusion of the left ramus descendens alone usually produces changes in the cardiac rhythm and very often causes fatal ventricular fibrillation, the combination of venous and arterial ligations prevents the appearance of these dangerous symptoms. Thus it is strikingly apparent that even an organ so sensitive to a diminished oxygen supply as the heart continues to work almost normally if the venous blood, presumably with a small admixture of arterial blood, fills the blood vessels of the ischæmic area. Analogous conditions were met with in the stomach when most of its arteries were ligated but the veins left intact.

Six patients with severe angina pectoris were operated on by Dr. Fauteux at the Royal Victoria Hospital. A detailed description of one of these cases, in which the operation relieved the patient of anginal pain, has been given by Fauteux and Palmer.[4]

Another striking example of the formation of collateral arterial circulation and restoration of impaired function, although this time the restoration was incomplete, is provided by the work of Dr. L. A. Andreyev[5] dealing with the effect of reduction of the cerebral blood supply on the functional capacity of the brain. Dr. Andreyev used the method of motor and salivary conditioned reflexes for the investigation of cortical activity. This work was performed in the laboratory of the senior author, so again we possess first-hand information concerning the effect of de-arterialization on the function of an organ.

When Dr. Andreyev in dogs simultaneously ligated four arteries (both common carotid and both vertebral) in the neck, the animals in about 40% of cases died within twenty-four hours, exhibiting symptoms of acute bulbar anæmia. The fatalities occurred chiefly among the older animals. If, on the other hand, the ligation of the arteries supplying the brain was performed gradually, at intervals of from ten to fourteen days, the dogs survived the operation. Collateral passages began to develop almost immediately after the operation and their formation was completed in about four weeks. The subsequent enlargement of the collateral passages and of the anastomoses might continue for a year or more. Collateral passages developed between many small arteries, such as the caudal thyroid and cranial thyroid arteries, or the muscular branches of the vertebral arteries and the occipital and posterior auricular arteries, and so on.

The limitation of the cerebral arterial circulation produced temporary or permanent disturbances of the cortical activity. During the first ten to twelve days after the operation the conditioned reflexes had completely disappeared. Thereafter they began gradually to return. Owing to a temporary state of general excitation, which prevailed after the operation and after the restoration of the conditioned reflexes, many inhibitory conditioned reflexes were disinhibited. Crude differentiations between two stimuli which had been established before the ligation of the arteries were only slowly restored. The more elaborate functions of the hemispheres, such as formation of fine differentiations between two neighbouring stimuli, or formation of delayed conditioned reflexes, might be lost

for a very long period of time or even permanently. After the general excitation subsided, it was replaced by inhibition which dominated the whole behaviour of the animal, whose character was now radically changed. Thus the cerebral cortex seems to be extremely sensitive to circulatory disturbances, much more so than the heart.

EFFECTS OF REDUCING GASTRIC BLOOD SUPPLY

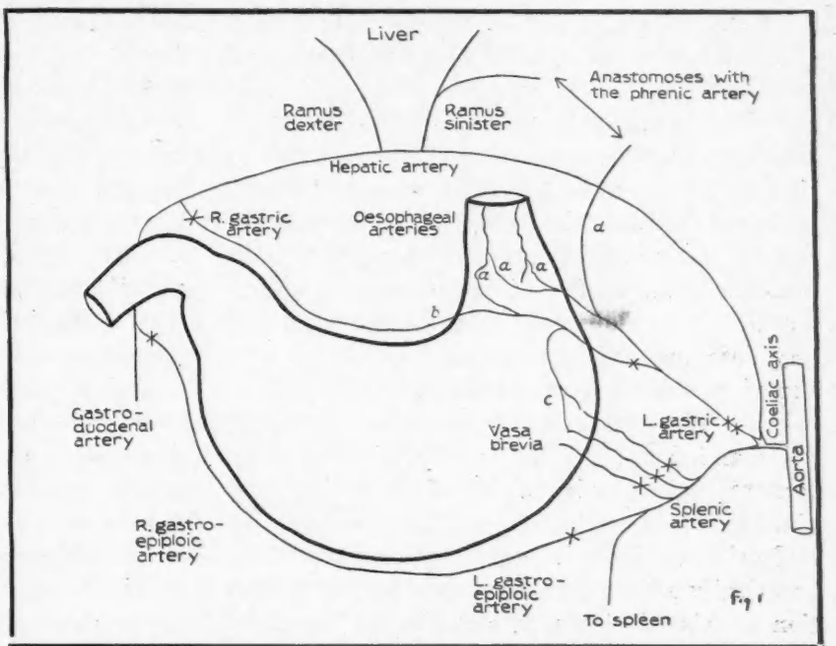
After these preliminary remarks we turn to our main theme—the effect of partial or complete devascularization or de-arterialization of the stomach. As we shall see, the stomach represents the opposite extreme from the brain as regards ability to resist reduction of the arterial blood supply, for a most drastic reduction of its arterial circulation has extremely little effect on its function.

As is well known, all the arteries of the stomach are derived ultimately from the *cœliac axis*. The fornix and the corpus receive their blood supply from the *left gastric artery, vasa brevia* and *left gastro-epiploic* artery. The pyloric part is supplied by the *right gastric artery* and the *right gastro-epiploic artery*. For a proper evaluation of any work dealing with the ligation of the gastric arteries it is important to remember the following:

1. Multiple anastomoses exist between the branches of the left gastric artery and (*a*) the œsophageal arteries; (*b*) the phrenic arteries; (*c*) the right gastric artery; (*d*) the vasa brevia, and there are (*e*) anastomoses between the branches of the hepatic and phrenic arteries (Fig. 1).

2. The submucous arterial plexus, from which the gastric mucosa receives its blood supply, surrounds practically the whole stomach, so that all its parts are connected with each other by arterial channels. From this plexus arise small arteries, with a very few anastomoses between them. They may rightly be considered as end-arteries (Fig. 2).

The problem of the partial or total restriction of the arterial or of the arterial and venous circulation in the stomach is of both theoretical and clinical interest. The following questions may be asked by a surgeon:



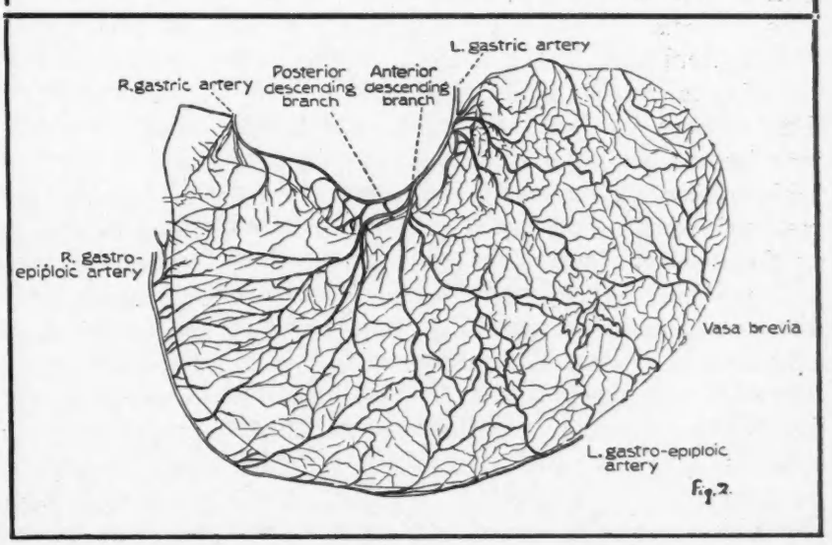


Fig. 1.—Schematic representation of anastomoses of the left gastric artery in the dog, showing anastomoses with *a* the œsophageal arteries, *b* the right gastric artery, *c* the vasa brevia, and *d* the phrenic artery. The crosses on the arteries mark the points where they were tied and cut. In some dogs the left gastric artery was tied close to its branching from the cœliac axis (two crosses), in others it was tied somewhat above (single cross), a small branch going to the œsophagus being left intact. (Modified from Ellenberger and Baum.[6])

Fig. 2.—Schematic representation of the arterial net surrounding the stomach in man. In the preparation of the stomach from which this drawing was made, the muscular layers were removed and the arterial net of the submucous layer became evident. (Modified from Hofmann and Nather.[7])

1. Is it permissible in the case of a gastric hæmorrhage to tie the gastric arteries nearest to the point of bleeding? Would not such radical interference with the arterial circulation of the stomach produce a necrosis of that part of its wall which receives blood from a tied artery? From the surgical literature concerning this problem and the personal experience of one of us (J.C.A.) in the Royal Victoria Hospital it appears that this procedure is correct. Some surgeons, *e.g.*, Faucher,[8] have even observed a beneficial effect from this operation in cases of gastric ulcer.

2. Would it not be possible by partial or almost total devascularization of the stomach to diminish the production of acid gastric juice and thus facilitate the healing of a peptic ulcer? Several surgeons have been interested in the possible curative effect of restriction of the blood circulation in the stomach, but have not reached any definite conclusions. Yet it might be presumed that such a devascularization would result in a diminution of the production of gastric juice and, hence, of the acidity of the gastric contents. The parietal cells of the gastric glands, which elaborate a 0.5% solution of hydrochloric acid in great quantity, receive practically all the fluid necessary for the formation of this solution from outside, *i.e.*, from the blood vessels. Could not a restriction of the blood circulation in the stomach diminish its capacity to produce hydrochloric-acid solution? Furthermore, by tying or cutting the gastric arteries one severs a great number of nerves which follow the course of these arteries. Would not such mass destruction of the nerves going to the stomach diminish its secretory function?

It was only natural that these considerations should arouse the interest of the two co-authors of this paper, Drs. J. C. Armour and D. R. Webster. We thought that an operation could be devised involving the ligation of gastric arteries and veins and that it might be applied in cases of peptic ulcer if it really would diminish the production of acid gastric juice, the excessive secretion of which is held by many clinicians to be responsible for the formation of peptic ulcers and prevention of their healing. Technically, the operation of devascularization of the stomach is not too difficult and, what is rather important, it preserves the organ intact.*

* We were informed (personal communication) that Mr. Wilson H. Hey, Surgeon, of Manchester, England, had performed this operation in peptic-ulcer patients with good results.

For my part I was interested in the effect of devascularization on the function of such an organ as the stomach from the physiological point of view (B.P.B.). If there is a diminution of gastric secretion after interference with the blood supply of the stomach, this effect certainly could not be ascribed to partial denervation of the stomach by cutting of the nerves following the arteries. These nerve fibres belong almost exclusively to the sympathetic and not to the parasympathetic nervous system. The latter nervous system alone is responsible for the secretion of acid gastric juice. The function of the sympathetic nerves in relation to the gastric mucosa is quite different. Several years ago in our laboratory Dr. S. G. Baxter[9] showed that the sympathetic nerve contains few, if any, secretory fibres for the gastric glands, but its stimulation causes a secretion of alkaline mucus. After section of both splanchnic nerves Dr. Baxter observed a mucoid "paralytic secretion" in the stomach, which, however, subsided three to four weeks after the splanchnectomy. In animals deprived of their gastric sympathetic innervation all the usual stimuli, such as sham-feeding, histamine and so on, evoked secretions showing the same characteristics with respect to volume, acidity and peptic power as before the operation. Therefore the diminished volume of acid gastric secretion which Mr. Hey observed after devascularization of the stomach in animals and patients was evidently due not to the sympathectomy but to other causes.

Another point which interested us in the operation of devascularization of the stomach from the morphological as well as from the physiological standpoint was the formation of collateral circulation. A stomach with a diminished arterial blood supply would be a third organ that could give us information concerning the restoration of interrupted vascular paths and damaged function. Thus arose this joint experimental investigation, the results of which are now presented to you. Our thanks are due to Mrs. Olga Komarov and Mr. T. W. Ritchie for their valuable technical assistance in the carrying out of this work.

EXPERIMENTAL RESULTS

The work was so planned that, besides control experiments involving the tying of the gastric arteries and veins or of the arteries alone in ordinary healthy dogs, a systematic study of the

secretion of gastric juice was performed on dogs with œsophagotomy and a gastric fistula before and after ligation of the gastric blood vessels. The gastric secretion was stimulated in these animals reflexly (by sham-feeding) or by chemical means (histamine administration). The volume, the free and total acidities, the concentration of total chloride and the peptic power (Mett's method) of the gastric secretion were determined.

The investigation was planned on these lines for the following reasons. There are several papers (which will be referred to later) dealing with the effect of total or partial devascularization of the stomach in animals. However, the experimenters were interested chiefly in the mere survival of the animals after operation and far less in the effect which devascularization of the stomach might produce on its secretory function. They made no systematic and extensive studies of the gastric secretory function before and after the restriction of the blood circulation in the stomach.

Three series of experiments were performed.

Series I. Total devascularization of the stomach (three dogs).—The abdomen was opened and all the gastric arteries and veins were tied in two places and cut between the ligatures. Within forty-eight hours the animals were quite ill and they all died on the third day. At autopsy the stomach was found to be swollen and necrotic in each case, with perforation of the greater curvature involving the distal portion.

Before we performed this work the effect of devascularization of the stomach in dogs had been studied by Bernheim.[10] He tied some or all of the arteries and veins on the lesser or the greater curvature, or on both curvatures at once. Only complete devascularization of the stomach on both curvatures was fatal. Partial devascularization of the stomach not only did not cause death but hardly changed the secretory response of the stomach to an Ewald test meal in an animal. No ulcer was formed as a result of partial ligation of the gastric blood vessels. However, Bernheim noted (and this was confirmed by us) that after total devascularization of the stomach it was the greater curvature that became gangrenous, the lesser curvature remaining unaffected.

Series II. Ligation of the main gastric arteries (six dogs).—Since the complete devascularization of the stomach had proved to be an unsuitable operation, we decided to study the effect of ligating the main gastric arteries, leaving all the veins intact. Each artery was picked up separately, tied and cut. On the greater curvature the vasa brevia were tied and cut, as well as all the arteries in the omentum. In four dogs a small branch of the left gastric artery was left untied. All the animals survived and showed no ill effects. They were killed and autopsied at different times (from one week to six months) after the operation.

In two dogs special care was taken not to leave untied any artery of significant calibre and the left gastric artery was tied and cut at its origin in the cœliac axis. One of these animals unfortunately died twenty-four hours after the operation, presumably from shock or the effects of the anæsthesia. At the post-mortem it was observed that the stomach was not gangrenous, and only slightly cyanotic.

Another animal, in which all the gastric arteries with the exception of the œsophageal arteries were tied, was kept alive for eighty-three hours after the operation. Recovery was uneventful, but the dog looked dull. It was given water on the second day and some milk on the third day which it consumed without relish. Eighty-two hours after the operation the dog received two injections (1 mgm. each) of histamine phosphate, the second forty-five minutes after the first. The resulting gastric secretion was scanty and the juice aspirated through a tube had a brownish colour. Only 15 c.c. of this secretion could be collected. The last portion of juice that was aspirated (1 hour and 7 minutes after the first injection of histamine) had a free acidity of 36, and a total acidity of 52 m.eq./l. The animal was then sacrificed and its arterial system injected with a coloured rubber paste. At the post-mortem it was found that the arteries on the surface of the stomach contained very little of the paste. The left lobe of the liver, the spleen and part of the omentum were adherent to the stomach. The mucous membrane of the stomach was pale but looked normal, except for a single gangrenous spot, ½ inch long and ¼ inch wide, at the greater curvature near the pyloric antrum.

This experiment shows that the ligation of all the gastric arteries but the œsophageal is a very dangerous operation and may result in the formation of localized foci of gangrenous degeneration in the gastric mucosa. However, the remarkable fact remains that, even under

these circumstances, the stomach secreted acid gastric juice.

Series III. Ligation of the gastric arteries: its effect on gastric secretion.—The gastric secretion was studied in three dogs with œsophagotomy and a gastric (metal) fistula, before and after the ligation of all the arteries supplying the stomach with blood, except the œsophageal arteries and a small branch of the left gastric artery.

Gastric secretion was stimulated in these animals by five minutes' sham-feeding with meat or by subcutaneous injection of a small dose (0.6 to 1 mgm.) of histamine phosphate. After the normal response to these stimuli had been established and the composition of the gastric juice in each case had been studied, the animals underwent the operation of arteriectomy. The abdomen was opened by means of an inverted V-shaped incision along the costal cartilages, the gastric fistula thus being left intact, and all the arteries supplying the stomach with blood, except a small branch of the left gastric artery, were tied and cut between the ligatures. In one animal the greater omentum was removed. All three dogs quickly recovered from the operation.

The first experiment (involving sham-feeding or administration of histamine) was usually performed as early as the fifth or seventh day after the operation. Table I shows the average values for all the experiments, in respect of the volume, free and total acidities, concentration of total chloride and peptic power of the gastric secretion, before and after the operation of tying the gastric arteries. The following conclusions may be drawn from these figures.

Although in some instances the *volume of gastric secretion* was slightly diminished after the arteriectomy, in others it was slightly increased. In the case of the secretion evoked by sham-feeding the diminution might have been due partly to loss of appetite as a result of the operation. However, a month after the operation the secretory response of the stomach, as may be seen from Table II, had returned practically to normal.

There was hardly any change in the *free and total acidities* of the gastric juice after the operation. The same was true of the *total chloride concentration* of the secretion.

There was, however, some diminution of the *peptic power* of the gastric juice elicited by sham-feeding in two dogs. It may be presumed that the very delicate nervous mechanism responsible for the discharge of the enzyme from the peptic cells might be damaged by a temporary anæmia of the gastric mucosa, or that the anæmia diminished the ability of these cells to elaborate the enzyme. It is possible that in Dog "Tr" the sham-feeding gastric juice of which even exhibited a somewhat stronger peptic power after the operation the arterial circulation in the stomach was not reduced quite so much, nor was the neuro-glandular apparatus of the gastric mucosa damaged to the same ex-

TABLE I.

AVERAGE FIGURES FOR VOLUME AND COMPOSITION OF GASTRIC SECRETION EVOKED BY HISTAMINE AND BY SHAM-FEEDING IN THREE DOGS BEFORE AND AFTER THE OPERATION OF ARTERIECTOMY

	Administration of Histamine Phosphate						*Sham-feeding (5 min.)*				
	Dose mgm.	*Volume in 1¼ hr.* c.c.	*Free HCl* m.eq./l.	*Total HCl* m.eq./l.	*Cl* m.eq./l.	*Pepsin Mett units*	*Volume in 1½ hr.* c.c.	*Free HCl* m.eq./l.	*Total HCl* m.eq./l.	*Cl* m.eq./l.	*Pepsin Mett units*
Dog "C"											
Before operation:											
Nov. 26—Jan. 17.....	0.6	69.3	132	143	166	29	51.9	123	141	166	221
After operation:											
Feb. 4—Mar. 21.....	0.6	53.8	136	146	167	35	47.1	127	140	163	160
Dog "Tr"											
Before operation:											
May 15—Aug. 3.....	1.0	62.8	115	126	158	67	73.5	114	129	156	157
After operation											
Aug. 9—Oct. 16.....	1.0	81.7	115	128	160	66	68.2	112	125	160	181
Dog "To"											
Before operation:											
July 28—Sept. 26.....	1.0	78.0	134	144	162	23	94.8	129	146	159	147
After operation:											
Oct. 14—Nov. 21.....	1.0	78.3	135	155	166	38	110.0	122	138	154	77

tent, as in Dogs "C" and "To". In all three dogs the peptic power of the histamine gastric juice was hardly changed at all after the operation. The explanation of this is that the discharge of pepsin, when the gastric glands are stimulated by histamine, is passive and depends on the flow of the liquid parts of the gastric secretion between and over the peptic cells.

In Table II, by way of example, the whole experiment on Dog "C", which lasted almost four months, is represented.

tudinal muscles of the stomach patches of hyaline degeneration could be seen.

The motor function of the stomach did not suffer appreciably in our dogs, for the evacuation time was normal, which was apparent from the fact that in the morning the stomach was usually empty of food given the night before. Soon after the operation Brenckmann's dogs could even digest bones, seemingly without difficulty.

What would happen to the secretory function

TABLE II.

VOLUME AND COMPOSITION OF GASTRIC SECRETION OF DOG "C" IN RESPONSE TO HISTAMINE ADMINISTRATION AND TO SHAM-FEEDING BEFORE AND AFTER THE OPERATION OF ARTERIECTOMY

Date	*0.6 mgm. Histamine phosphate*					*Sham-feeding (5 min.)*				
	Volume in 1¼ hr. c.c.	*Free HCl* m.eq./l.	*Total HCl* m.eq./l.	*Cl* m.eq./l.	*Pepsin Mett units*	*Volume in 1½ hr.* c.c.	*Free HCl* m.eq./l.	*Total HCl* m.eq./l.	*Cl* m.eq./l.	*Pepsin Mett units*
Nov. 26						44.6	120	144		272
" 28						53.9	131	146		227
Dec. 11	66.5	131	143	164	33					
" 13	80.7	133	145	169	33					
" 20	60.9	133	142	167	20					
Jan. 8						65.8	124	142	166	200
" 10						39.4	120	137	166	208
" 17						55.1	122	137	167	200
Average before operation	69.3	132	143	166	29	51.1	123	141	166	221
January 29	Operation									
Feb. 4						31.7	102	120	154	107
" 6	43.5	125	137	165	38					
" 12						53.4	126	139	168	108
" 14	52.2	128	141	171	24					
" 20						46.8	132	142	164	158
" 26						44.9	132	142	163	184
" 28	60.3	145	155	171	34					
Mar. 5						40.5	131	144	163	234
" 7						53.1	134	146	166	147
" 12	54.4	139	148	166	48.5					
" 14	51.2	138	146	165	35					
" 19						59.8	133	146	166	186
" 21	61.6	142	151	168	31					
Average after operation	53.8	136	146	167	35	47.1	127	140	163	160

In none of our dogs was the gastric mucous membrane damaged in any way by arteriectomy. No ulcers were formed and blood was never found in the gastric secretion, which could be taken as a sign that no erosions had appeared in the mucosa. We did not examine the devascularized stomach histologically, but this was done by Brenckmann.[11] He states that a month after almost complete de-arterialization of the stomach the gastric mucosa in his dogs had a normal appearance, although it seemed to be less vascularized than before the operation. Here and there in the circular and longi-

of the stomach if absolutely all its arteries were tied, we are unable to say. Brenckmann[11] claims that he tied all the arteries supplying the stomach. But, as a matter of fact, he tied both gastric and both epiploic arteries and the splenic artery above the origin of the vasa brevia in only one of the three dogs upon which he operated. (In the other two animals the vasa brevia were not tied.) He does not say anything about tying the œsophageal arteries, but he mentions that at the end of the operation not a single blood vessel was pulsating on the surface of the stomach. Two days after the

operation Brenckmann injected 1 mgm. of histamine into this dog and aspirated from the stomach 20 c.c. of turbid fluid, which undoubtedly was gastric juice, for its free acidity was 34 m.eq./l. and its total acidity 40 m.eq./l. and it was able to digest coagulated protein. A week after the operation the dog secreted in response to histamine a regular gastric juice with free and total acidities of 110 and 128 m.eq./l. respectively. The animal recovered completely and was sacrificed for histological study one month after the operation. One of our dogs with the same number of arteries ligated as Brenckmann's dog secreted gastric juice in response to histamine eighty-two hours after the operation (see Series II).

DISCUSSION

How is the arterial circulation partially maintained immediately after the ligation of the gastric arteries, and how is it subsequently restored?

From examination of the arterial circulation in the upper abdominal organs it is evident that tying of almost all the gastric arteries (except the œsophageal), as performed on dogs by Brenckmann and by Armour and Webster, does not completely deprive the organ of its arterial circulation. After the operation the arterial blood supply is maintained through the multiple anastomoses between the left gastric artery and the branches of the phrenic and œsophageal arteries. When the left gastric artery is tied, its branches receive blood not from the cœliac axis but through the already existing anastomoses with the phrenic and œsophageal arteries. Owing to the existence of the arterial net covering both surfaces of the stomach the most remote parts of the organ still receive arterial blood. Although the influx of blood is now much less than under normal conditions, it seems to be sufficient during the first few days after the operation to maintain an adequate supply of oxygen and nutrient material. The survival of the organ in each individual case must depend on the number of arterial anastomoses which existed before the operation. But it seems that in most dogs their number is sufficient to maintain the arterial circulation in the stomach.

Another remarkable phenomenon which we noted in dogs with the gastric arteries ligated was the participation in the revascularization of the stomach of all the organs surrounding it. Not only several months after ligation of the main gastric arteries, but even eighty-three hours after the operation in one animal and one week after in another we found on post-mortem examination that, as a rule, one or two lobes of the liver, the spleen, omentum, pancreas and the left kidney were adherent to the stomach. It is possible that these organs might establish anastomoses with the blood vessels on the surface of the stomach. In the dog that was sacrificed one week after the operation the arteries on the surface of the stomach contained only a very small amount of the special rubber paste with which the arteries of the animal had been injected. Nevertheless this dog produced a copious secretion of gastric juice in response to subcutaneous administration of histamine (40 c.c. of gastric juice aspirated from the stomach forty-five minutes after the injection of histamine had free and total acidities of 112 and 119 m.eq./l. respectively).

The work of Dr. Segall[12] enables us to understand better how an adherent liver or kidney is able to supply blood to the stomach. The surface of each lobe of the liver is covered by a network of anastomosing arterial blood vessels. These plexuses form the chief anastomotic path between the right and left hepatic arteries, which anastomose with the phrenic arteries. The phrenic arteries in their turn form connections not only with the left and right gastric arteries and the œsophageal arteries, but with the branches of the bronchial and pleural arteries and with the capsular arteries of the kidneys and the suprarenals. Therefore, through the adherent liver and kidney new anastomoses with the gastric arteries may be formed and through the anastomoses with the phrenic arteries the left and right gastric arteries, ligated at their origin, *i.e.*, near the cœliac and hepatic arteries respectively, will be filled with arterial blood (Fig. 1). Unless the de-arterialization of the stomach is complete, there is very little possibility that this organ will be deprived altogether of its arterial blood supply.

In animals which survived the tying of the gastric arteries for several months one could observe a marked enlargement of the arteries left intact at the operation, *e.g.*, of the œsophageal arteries, and also the formation of thick anastomotic branches. It is a well-established fact that after the ligation of a main arterial trunk the very small arterial branches are transformed in the course of several weeks into

massive arteries with a very well developed muscular sheath. They now form the link between the central and peripheral ends of the ligated main artery. Moreover, on the surface of the stomach the arterial branches descending from the lesser curvature were specially well developed. As is evident from the previous description, these arteries had the possibility of obtaining blood from the hepato-phrenico-œsophageal anastomoses. The arteries stretching from the greater curvature in the direction of the lesser curvature were deprived of this opportunity, because all the main arteries at the greater curvature were tied.

What actually stimulates the formation of collateral circulation, especially in the stomach, is difficult to determine. There are several theories in regard to the development of collateral blood vessels. According to the "mechanical theory" the rise of the blood pressure in the arteries above the ligature and the sharp fall of the blood pressure in those below it increase the pressure in the small arterial branches and thus stimulate their development. The "nervous theory" attributes the enlargement of the small arteries and arterioles after the ligation of a main arterial trunk to stimulation of the vasodilator nerves, which permits more blood to enter the small blood vessels. Another theory, which may be called "chemical", emphasizes the importance in the development of collaterals of the abnormal metabolism of an organ, or of part of an organ, deprived of its arterial blood supply.[13]

The existence of several theories purporting to explain a phenomenon is always a sure indication of its complex nature. The development of collateral circulation in the stomach after ligation of its main arteries is probably due to several factors. It seems that an important rôle is here played (1) by the emptying of the gastric arterial net with a consequent fall of blood pressure in it, and (2) by the abnormal metabolic processes taking place in the mucosal and muscular tissue of the stomach as a result of the diminished supply of arterial blood. However, these disturbances in metabolism cannot be very grave, because one week after the ligation of the main gastric arteries the stomach was already able to secrete a great amount of gastric juice of almost normal composition.

One further point deserves mention in connection with the de-arterialization of the stomach. Why does not brutal interference with the gastric arterial circulation damage the gastric mucosa and lead to the formation of peptic ulcers or even of erosions? This fact seems to be a contradiction of one of the best-founded explanations of peptic-ulcer formation, according to which the origin of an ulcer is linked with some disturbances in the arterial circulation of the gastric mucosa, which cause the formation of an infarct in the mucosa with subsequent disintegration of the latter. However, the ligation of the main gastric arteries, and hence the enormous reduction of the arterial blood supply to the stomach, seem almost never to result in the formation of infarcts in the gastric mucosa.

The proper explanation of these facts would seem to be that for the production of an infarct, preceding the formation of a peptic ulcer, stasis has to occur in mucosal arteries which are of the "end" type. As a contributing factor in the formation of a peptic ulcer one of us (B.P.B.)[14] has stressed the over-activity of the vagus nerve with subsequent excessive liberation in the gastric mucous membrane of histamine, which is able to produce a condition of stasis in the small blood vessels. On the other hand, when even a very small amount of blood trickles through the arteries, the tissue still preserves its integrity. Thus it is presumably not the diminution of the arterial blood supply to the stomach as a whole, drastic though it may be, that is responsible for ulceration, but the complete arrest of circulation in a restricted area of the gastric mucosa. If this assumption is correct, then the experiments here described and those of our predecessors emphasize the important rôle which all factors leading to the production of stasis in the gastric blood vessels play in the genesis of peptic ulcer. A temporary anæmia of the gastric mucous membrane, even a considerable one, is unable to produce such an effect.

CONCLUSIONS

The following conclusions may be drawn from our experiments.

Tying of all the gastric arteries and veins in the dog produces gangrene of the stomach and death of the animal.

In dogs with œsophagotomy and a gastric fistula ligation of most of the gastric arteries affects the secretory function of the stomach very little. In some of the animals after the

operation of de-arterialization of the stomach it was observed that the volume of gastric secretion evoked by sham-feeding or by subcutaneous administration of histamine was diminished for a short time. In some dogs the peptic power of the gastric juice secreted in response to sham-feeding was diminished for a time after the operation, while in others it was not. The acidity and the total chloride concentration of the gastric juice remained unchanged after the ligation of the arteries.

Owing to the existence of numerous anastomoses between the gastric and the œsophageal and phrenic arteries, as well as to the presence of an arterial net surrounding the stomach, the arterial blood circulation in the stomach could hardly be upset very seriously by the ligation of its main arteries.

After the ligation of the main gastric arteries the remaining arteries are greatly enlarged and new anastomoses are formed through the adhering liver, spleen, kidney, pancreas or intestine.

The stomach resists the reduction of its arterial blood supply better than the heart and much better than the brain. No permanent damage of the secretory or the motor function of the stomach occurs after almost complete de-arterialization of the organ.

Tying of most of the arteries supplying the stomach with blood never leads to the formation of peptic ulcers or even of mucosal erosions.

From the clinical point of view the following conclusions may justifiably be drawn from this investigation:

In cases of profuse gastric hæmorrhage it is permissible to tie one or two arteries nearest to the point of bleeding, since this will not produce gangrene of the gastric wall or peptic ulcer.

Tying both of the gastric arteries and of the gastric veins is a dangerous operation, if a great many of these blood vessels are ligated, for it causes gangrene of the stomach. When some of the arteries and veins are tied, *e.g.*, only those on the greater or only those on the lesser curvature, the corresponding area of the stomach does not become gangrenous, but the operation fails to produce any diminution of the volume or the acidity of the gastric secretion.

Tying of most, but not all, of the gastric arteries cannot serve as a means of diminishing either the volume of gastric secretion or its acidity and peptic power.

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Considerable interest has been aroused by the suggestion that the time is ripe in this country (England) for the formation of a nutrition council composed of clinicians, laboratory workers, and medical officers of health who would keep in constant touch with economists, agriculturalists, school authorities, factory workers, and canteen organizers. It would draw up a plan for periodical nutrition surveys of representative groups of the population and send out teams charged with the task of securing detailed pictures of the local nutritional level in towns, villages, factories and schools. It would work in close collaboration with the Ministry of Health so that food policy could be co-ordinated with nutritional policy. It would also assist in the post-war feeding of occupied territories: nutritional needs, it is pointed out, will differ in the various countries, and whereas Scandinavia will probably need vitamin C, the most likely shortage in Spain will be of vitamin B and in Greece of calories. Lord Horder states that the case for a nutritional council has been put forward with such conviction that on the score of principle there is nothing more to be said, and there remains only the question of the machinery. He can conceive no more powerful token of British intention to co-operate in post-war health and economics than the coming into existence now of an *ad hoc* body that can function both internationally and nationally along the lines indicated.—*J. Roy Inst. of Hygiene & Pub. Health*, 1942, **5**: 179.

THE WORK OF THE MEDICAL BRANCH OF THE ROYAL CANADIAN NAVY*

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Introductory Address

THE Medical Branch of the R.C.N. continues to grow in wisdom and stature and, we trust, in favour with God and man. We have now some 255 medical officers serving as always at home and on the Seven Seas. In case you are interested, 148 of these are between the ages of 24 and 30; 71 between 31 and 40; 18 between 41 and 50; and 4 have reached the mellow age of 50 years. This seems to strike a fairly good balance between enthusiasm and experience.

You are by now well acquainted with the history of our humble origin, how, starting from scratch, our Service has carefully felt its way along, doing its best to select those who would seem to fit into the naval mode of life where in small wardrooms, mess-mate personalities must be hand-picked. The response received from the publication of our mimeographed articles has indicated that our medical officers have been quick to put on paper original observations as presented through the clinical side of naval life. Letters from the boys abroad tell of their appreciation of being kept informed of what goes on through this medium.

We have been pleased to welcome home several of our M.O.'s who have seen service with the R.N., and, whether it meets their wishes or not, we have felt it good policy to retain them on this side of the Atlantic so that they may see something of the work that is being done in their own Navy. There are many volunteers who are only too anxious to take their place where the smoke and fire of battle is more apparent. Consequently, for each M.O. who has returned a relief has been sent abroad. Every effort has been made to secure the odd refresher course for a limited number of medical officers. It is hoped that this program will be expanded so that those who have had less opportunity for clinical study will not be permitted to become too rusty. No doubt, in such a program, those who have served abroad will receive first consideration.

The picture of our Medical Branch as presented by statistics becomes more favourable with the passing of time. It is rather remarkable that in the first 37 months of the war there have been but 33 deaths out of a total of 455,000 hospital days. This of course excludes deaths by accident or enemy action; but when one considers that out of these 33 deaths through what one might term "organic disease or infection" two-thirds of them offered little or no chance for recovery by any known method of treatment, the efficacy of treatment is rather amazing.

Herewith is a summary of these cases which should prove interesting: also the latest summary dealing with the examination and rejection of recruits. It will be noticed how consistent the 11.1% rejection rate is with previous summaries and implies a very favourable state of fitness in the country as a whole. Discharge after entry as Category "E" also

Table I.

Deaths, Royal Canadian Navy, Died of Disease Canada Only

Cause	*Number of cases*
Cerebrospinal meningitis	2
Tuberculous meningitis	2
Miliary tuberculosis	1
Heart conditions	5
Pulmonary tuberculosis	1
Peritonitis	3
Pancreatitis	1
Pneumonia	3
Hæmorrhage (pulmonary)	1
Encephalitis	1
Leukæmia	1
Agranulocytosis	1
Streptococcus throat	1
Carcinoma of lungs	1
Carcinoma of stomach	1
Appendicitis	2
Intestinal obstruction	1
Nephritis	1
Septicæmia	1
Postoperative herniotomy	1
Anæsthetic (procaine sensitivity)	1
Pulmonary embolus (postoperative ca. of stomach)	1
Total	33

The above report covers the period from September, 1939 to October 17, 1942.

* Taken from collected articles of members of the Medical Branch of the R.C.N.

TABLE II.

SUMMARY OF RECRUITS EXAMINED AND REJECTED, MAY, 1941, TO AUGUST, 1942 (INCLUSIVE)

Division	Number examined	Rejected for															Rejected	
		Arthritis and rheumatism	Cardio-vascular	Digestive (not ulcer)	Deformities and injuries	Ear	Eye {vision / colour}	Foot	Genito-urinary	Hernia	Nervous and mental	Peptic ulcer	Respiratory (non-tuberculous)	Skin	Tuberculosis	Miscellaneous	Total	%
Charlottetown..	639	5	13	1	4	19	24	2	2	10	2	5	7	1	19	9	123	19.2
Halifax.....	2,721	2	24	1	12	41	80	13	8	8	5	3	16	0	35	35	283	10.4
Quebec.....	675	2	11	2	11	10	25	1	6	3	1	0	3	3	15	24	117	17.3
St. John, N.B..	627	0	6	7	5	7	20	0	2	2	2	1	3	1	6	6	68	10.8
Montreal.....	4,075	11	21	10	8	52	69	12	4	49	10	3	15	6	41	64	375	9.2
Ottawa.....	2,294	0	10	4	11	18	52	7	2	18	4	3	10	4	25	19	187	8.1
Kingston.....	848	1	23	1	9	13	12	0	5	8	8	2	12	0	2	10	106	12.0
Toronto.....	4,233	3	14	4	14	37	51	6	8	34	1	0	9	1	9	33	224	5.2
Windsor.....	1,170	5	27	19	20	25	68	8	1	24	3	3	9	1	7	23	243	20.7
Hamilton.....	2,086	0	18	7	18	33	61	6	8	26	5	4	8	3	5	36	238	11.4
London.....	1,772	4	23	2	11	22	47	7	9	24	5	1	6	1	7	13	182	10.2
Port Arthur....	984	0	20	11	9	16	27	5	1	13	4	8	18	3	6	14	155	15.7
Winnipeg.....	3,188	0	15	2	43	21	143	2	14	56	1	11	7	1	18	141	475	14.9
Edmonton.....	1,415	0	9	1	12	13	31	7	6	15	6	4	4	1	4	37	150	10.6
Calgary.....	1,393	4	5	0	10	7	19	9	0	12	6	6	9	5	7	13	112	8.0
Regina.....	951	5	15	1	6	19	24	1	19	11	5	1	10	2	2	20	141	14.8
Saskatoon.....	1,426	11	13	0	9	17	25	4	35	28	7	10	4	5	7	57	232	16.2
Vancouver.....	2,625	3	40	16	20	35	83	6	15	22	10	13	29	4	9	27	332	12.6
Esquimalt.....	2,894	3	32	22	15	22	72	9	5	8	19	8	12	4	7	20	258	8.9
Total.....	36,016	59	339	111	247	427	933	105	150	371	104	86	191	46	231	601	4,001	11.1
% of unfit with.....		1.4	8.2	2.7	6.1	10.4	23.3	2.6	3.7	9.2	2.6	2.1	4.7	1.1	5.7	15.0	11.1% rejected	
% of examined rejected for		0.16	0.94	0.30	0.68	1.18	2.59	0.29	0.41	1.03	0.28	0.24	0.53	0.12	0.64	1.66		

remains very consistent. There were 1,345 discharged unfit to the end of September, 1942. This represents a discharge rate of 3.03% of the strength as at that date. Considering that this includes those discharged through legitimate illness acquired on service, for conditions which came to light and which could not be detected at the original examination, it would appear that examinations at the recruiting centres have erred very little.

The total hospital days previously mentioned represent a time-loss to the days available for work of 2.61%, or 9.5 days per annum per man. This is exactly the same figure as revealed in a survey made last year of the time lost by industry in the United States through sickness and accident. Comparing the life of a civilian working in comparatively sanitary factories with adequate ventilation and spending the rest of his time in the comforts of his own home to the life of a sailor in seagoing ships confronted with the rigors of a North Atlantic gale or housed in crowded barracks, it would appear that the general health of the "troops" leaves little to be desired, or, should we say, that the work done by the Medical Branch on behalf of the sailor is of an exceptional quality, at least that is our interpretation and we are going to stick to it. This point is emphasized by the following summary of the principal infectious conditions encountered from the beginning of the war until September 30, 1942: Cerebrospinal meningitis 42 cases, two deaths; diphtheria 230 cases, no deaths; scarlet fever 372 cases, no deaths; pneumonia 546 cases, three deaths. It is difficult to believe that almost twelve hundred cases of such a serious type could be handled with only five deaths.

We grieve over the loss of three of our number — Nursing Sister Wilkie who went down with the *Caribou*, Surgeon Lieut. Winthrope who was lost in the commando raid at Ste. Nazaire, and Surgeon Lieut. Hendry who was lost with H.M.C.S. *Ottawa*. We sympathize with Surgeon Lieut. Comdr. Fisher who remains in the hands of the enemy; but we rejoice in the distinction which has come to Surgeon Lieuts. G. P. Fahrni and A. W. Clark by their well merited awards—the Distinguished Service Cross. Such events, be they losses or gains, bring credit to our medical branch and to the Service as a whole.

Since the above was written, two other Medical Officers have been reported missing, presumed dead: they are Surg. Lieut. J. D. Bourgeois and Surg. Lieut. J. E. Powell.

A PLASTIC FILM TREATMENT OF EXPERIMENTAL BURNS

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THE investigation of a proposed treatment for burns should include a comparison of its healing power, anti-infective ability and other properties with the accepted treatments of the day. Such a comparison is best made by the study in animals of a large number of carefully controlled experimental burns, which can be closely standardized. A thorough review of the literature failed to reveal an acceptable way of producing experimental burns.

This paper deals with the properties of two new burn fluids. These fluids, Burn Fluid 19 and Burn Fluid 20 of Sivertz,[1] were compared with tannic acid and triple dye on carefully standardized burns on rabbits.

HISTORICAL

Davidson[2] in 1925 introduced the tannic acid treatment for burns which ushered in the modern era of burn therapy. Previous to 1925 paraffin treatment was popular, but tannic acid possessed such obvious advantages both observable and theoretical that it soon became the method for the treatment of severe burns.

In the treatment of burns about the face and hands, tannic acid has been found to be unsatisfactory. The reviews of McClure and Allen[3] and Glover and Sydow[4] give excellent accounts of the value and dangers of the tannic acid treatment of burns.

Dye therapy was introduced in 1933 by Aldrich.[5] In 1937 the same author[6] suggested triple dye treatment for burns. Since then there have been many practitioners who favour triple dye, but tannic acid still has a large following.

The introduction and local use of sulfonamides soon suggested their use in the treatment of burns. Kenneth Pickrell[7] reported excellent results treating 100 burns with 3% sulfadiazine solution in 8% triethanolamine and water. The burn fluids used in this work were essentially solutions of sulfonamides in polyvinyl alcohol. These solutions when applied formed a plastic film over the wound.

EXPERIMENTAL

Adult rabbits were used in all our experiments. The reaction of this animal's skin to a burn differs considerably from that of the human subject. Even in very severe burns in the rabbit the separation of the epidermis from the dermis does not take place. The skin simply becomes thickened, indurated, dry, and remains in position until the underlying wound is practically healed.

Steam under pressure was used to produce the burns in these experiments. A bell-shaped tambour into which steam was passed was placed over the area to be burned. In order to ensure the same degree of burning in all areas the steam was supplied from an autoclave kept at a constant pressure and the tambour was applied for a fixed time. To avoid the hardened skin and in order to expose the burned tissue below, two methods were used.

In the first method (burn method A) the skin was burned with steam at 11 lb. pressure for 30 seconds. Two days later the hardened skin was cut out, exposing the underlying burned tissue. This method was used first, but it was difficult to cut out the burned skin and burn method B has replaced burn method A. In the second method (method B) the skin was cut out before the animal was burned. Then the steam was applied for 10 seconds at 11 lb. pressure. Six areas 3.5 cm. in diameter were burned on the dorsal aspect of each animal. Altogether 256 burns were produced and treated. Of these 229 were classed as non-infected burns. In this paper eight untreated burns (too small a group to possess statistical value) are not considered. Treatments were systematically rotated so that the area treated with each drug varied as much as possible in each animal.

Burn method A was used on 7 rabbits to produce 40 burns. The remaining 216 burns were produced by burn method B. Fifty-six burns were treated with burn fluid 19; 32 burns were treated with burn fluid 20; 84 burns were treated with tannic acid, and 60 were treated with light triple dye and 24 were treated with strong triple dye solution. The burns were treated and examined frequently. Observations were made as to ease of application, resulting eschar, the ease with which eschar was removed, infection, granulation tissue, and epithelization and healing time.

The infections that occurred were spontaneous and uncontrolled. The organisms responsible varied from streptococci to anaerobic bacilli.

TABLE I.

DAYS REQUIRED FOR COMPLETE EPITHELIZATION

Method used	*Rabbit No.*	*Burn fluid 19*	*Tannic acid*	*Triple dye Light*	*Triple dye Heavy*
A	103	31	40 (slight)	40	
		31	35	40	
A	105	Infected (slight)	39	47	
		28	47	Infected (mod.)	
A	106	31	33	40	
		37	39		
A	107	38	37	43 (slight)	
		33	38 (slight)	50	
A	108	29	37	43	
		34	50	50 (slight)	
A	109	35	Infected (severe)	43	
		36	40	43 (slight)	
A	110	36	39	43 (mod.)	
		35 (slight)	35		
B	112	32	35	43	
		30 (severe)	40	42	
B	113	31	40	47	
		32 (mod.)	36 (slight)	47	
B	114	26	40	36	
		26	36 (slight)	Infected (severe)	
B	115	29	29 (severe)	36 (slight)	
		26	36 (severe)	36 (slight)	
B	116	Infected (mod.)	44	36	
		28	36	44	
B	118	28	33	37	
		30	33	36	
B	119	31	31	39	
		19	31	46	
B	120	24	26	31	
		22	26	34	
B	121	24	39 (severe)	31	
		22	26	34	
B	123	29	30	35	
		24 (slight)	28	32	
B	124	26	39	39	
		35	Infected (severe)	44	
B	125	33	39	46	
		32	39 (severe)	46	
B	126	21		44	
		27		42	
B	127	27 (severe)	Infected (mod.)	40	
		31	38	40	
B	128	Infected (slight)	34	40 (slight)	
		27	34	36	
B	130	27	40		
		27	37 (slight)		
B	131	27	29 (mod.)	40	
		22	29	42	
B	132	28	28	45	
		30	30	Infected (severe)	
B	133	Infected (mod.)	32	37	
		28	Infected (slight)	37 (slight)	
B	134	28		37 (mod.)	
		27		43	
B	135	26	28	45	
		Infected (mod.)	30 (slight)	45	
		Burn fluid 20			
B	145	30	Infected (severe)	Infected (medium)	
		Infected (slight)	34	Infected (severe)	
B	147	30	35 (slight)	43	
		30	37	39	
B	149	28	35	39	
		31	35	35	
B	150	32	35	39	
		33	35 (severe)	39	
B	155	34	37		74
		29	33		44
B	156	25	Infected (severe)		95
		Infected (slight)	Infected (slight)		81
B	157	35	47 (slight)		63
		35	Infected (severe)		87
B	161	33	38 (slight)		42
		Infected (slight)	38		59
B	162	33	Infected (mod.)		72
		33	38 (slight)		72
B	164	28	32		73
		25	30		60
B	165	29	33 (slight)		78 (mod.)
		25	32		84
B	166	32	Infected (severe)		53
		31	38 (slight)		98
B	168	28	31		77
		Infected (mod.)	47 (severe)		77
B	170	Infected (mod.)	Infected (mod.)		Infected (slight)
		33 (slight)	35		74
B	172	28	41		67
		34	36		72
B	173	32 (slight)	30		67
		30	41 (slight)		76

Our bacteriological facilities were limited, so that we were unable to make a complete study of the infecting organisms. It is felt that our findings on infection are only an indication of the relative merits of the anti-infective ability of the treatments used.

The end-point of healing was arbitrarily decided. Healing was considered to be complete when epithelium covered the whole wound. It was found that the chosen point was easily and accurately recognized with moderate practice.

The following procedure was used in applying the burn fluids: (1) The solution was poured directly from the bottle on to the wound. (2) A sterile spatula was used to apply the solution evenly over the wound to a thickness of approximately 1/16". (3) A solution of 1/10 normal sodium borate was sprayed over the burn fluid. This caused almost immediate setting. (4) The liquid was allowed to dry for a few minutes. (5) At this stage several layers of the liquid were added if it seemed desirable to increase the thickness of the covering over the burn. (6) The eschar was left uncovered.

SOLUTIONS USED

Burn Fluid 19[1]

Glycerin	80 grams
Triethanolamine	5 "
Urea	5 "
Sulfathiazole	5 "
Sulfanilamide	5 "
Stock solution of methyl cellulose	100 "
Stock solution of polyvinyl alcohol (P.V.A.)	800 "

Burn Fluid 20[1]

Glycerin	40.0 grams
Triethanolamine	2.5 "
Urea	5.0 "
Phemerol	0.5 "
Sulfanilamide	5.0 "
Stock solution polyvinyl alcohol	947.0 "

Stock Solution of methyl cellulose

Methocel 25 C.B.D.	8.0%
Benzoic acid	0.1%
Ringer's solution to	100.0%

Stock Solution P.V.A.

Polyvinyl alcohol	8.0%
Benzoic acid	0.1%
Ringer's solution to	100.0%

NOTE: Polyvinyl alcohol first was dissolved without the aid of heat.
Then solution was completed at 60 to 80° C.
Dissolve methyl cellulose without heat.

The tannic acid solution used was a 5% aqueous solution applied with an atomizer.

Two triple dye solutions were used. The first was called strong triple dye solution and was originally suggested by Aldrich.[6] It contained brilliant green 2.5%, neutral acriflavine 2.5%, and gentian violet 2.5% in water. The weak triple dye suggested by Wakeley[8] is used chiefly in England. It contained brilliant green 1/1,000, neutral acriflavine 1/1,000, and gentian violet 1/1,000 in water. Both solutions were applied with an atomizer.

RESULTS

Table I gives the days of healing and indicates the infected burns and their classification. Burns marked infected with no healing time shown were classed as infected, for in these cases the infection apparently prolonged final healing. Infected burns whose healing time was close to the average for the particular treatment groups were considered as non-infected burns as regards healing time. In these cases the number of days of healing is shown on the table.

TABLE II.

AVERAGE NUMBER OF DAYS TAKEN BY FIVE TREATMENT GROUPS OF STANDARD BURNS ON RABBITS TO HEAL

Type of treatment	*Burns classed as non-infected*	*Total days of healing*	*Average number of days of healing*
Burn fluid 19	51	1,481	29.0
Burn fluid 20	27	827	30.6
Tannic acid	73	2,600	35.6
Weak triple dye	55	2,223	40.4
Strong triple dye	23	1,645	71.5

TABLE III.

NUMBER OF INFECTIONS OF 256 EXPERIMENTAL BURNS ON RABBITS

Treatment	*Strong triple dye*	*Burn fluid 19*	*Burn fluid 20*	*Weak triple dye*	*Tannic acid*
Infections:					
Number	2.0	10.0	7.0	14.0	31.0
Percentage	8.2	17.8	21.8	22.2	36.8
Severe:					
Number	0.	2.0	0.	3.0	13.0
Percentage	0.	3.6	0.	5.0	15.4
Moderate:					
Number	1.0	4.0	2.0	4.0	4.0
Percentage	4.1	7.1	6.3	6.6	4.8
Slight:					
Number	1.0	4.0	5.0	7.0	14.0
Percentage	4.1	7.1	15.5	11.6	16.6

Table I shows that burns treated with burn fluids 19 and 20 heal at least five days before the tannic acid treated burns, ten days before the burns treated with weak triple dye solution, and a full forty days before the burns treated with the strong triple dye solution.

Table II gives the average number of days taken by each treatment-group of non-infected (including those infected burns which healed as readily as the non-infected burn of their group) burns to heal. Fig. I represents graphi-

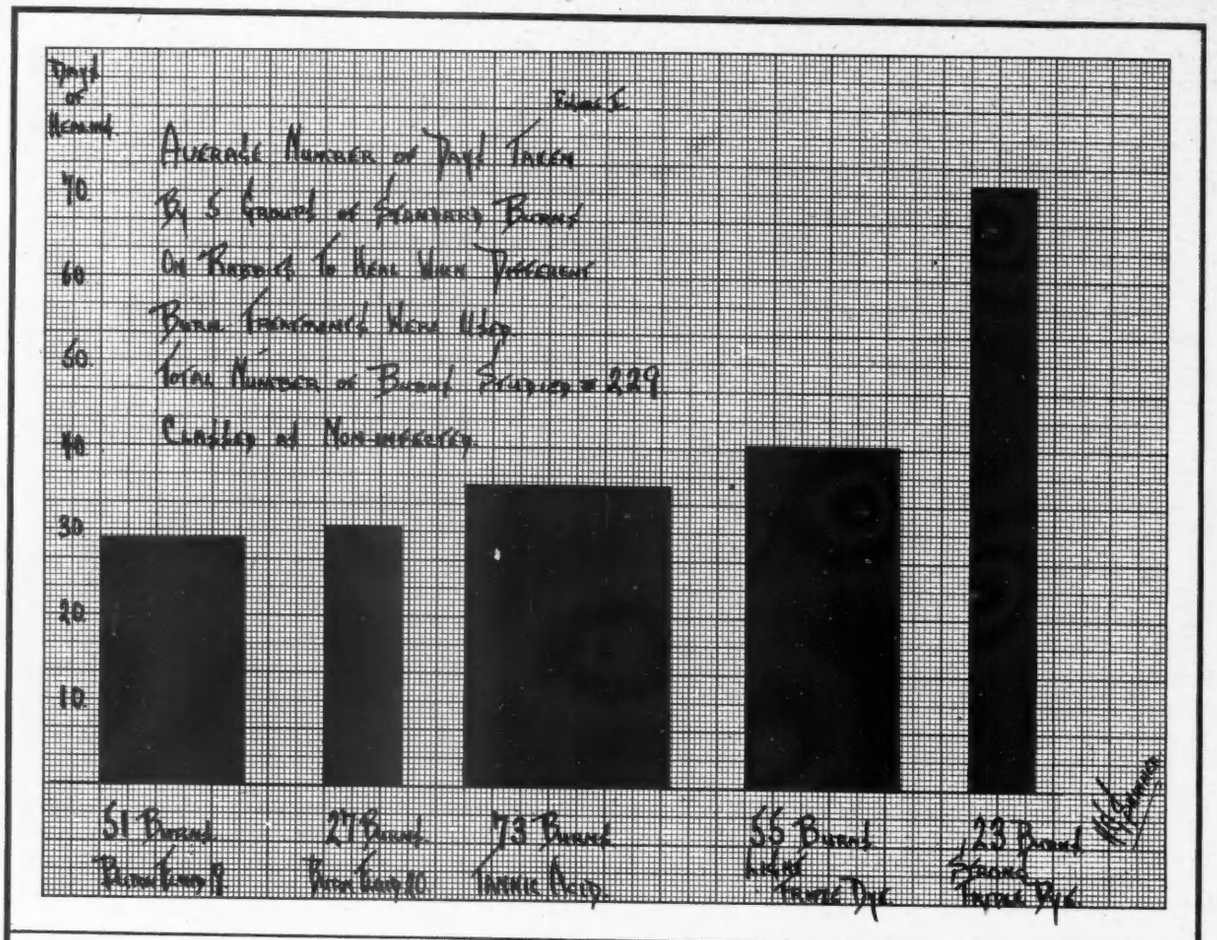

FIGURE 5.

AVERAGE NUMBER OF DAYS TAKEN BY 5 GROUPS OF SECONDARY BURNS ON RABBITS TO HEAL WHEN TREATED BURN IMMEDIATELY AFTER USE. TOTAL NUMBER OF BURNS STUDIED = 229 CONSTANT AT NON-NECROTIC.

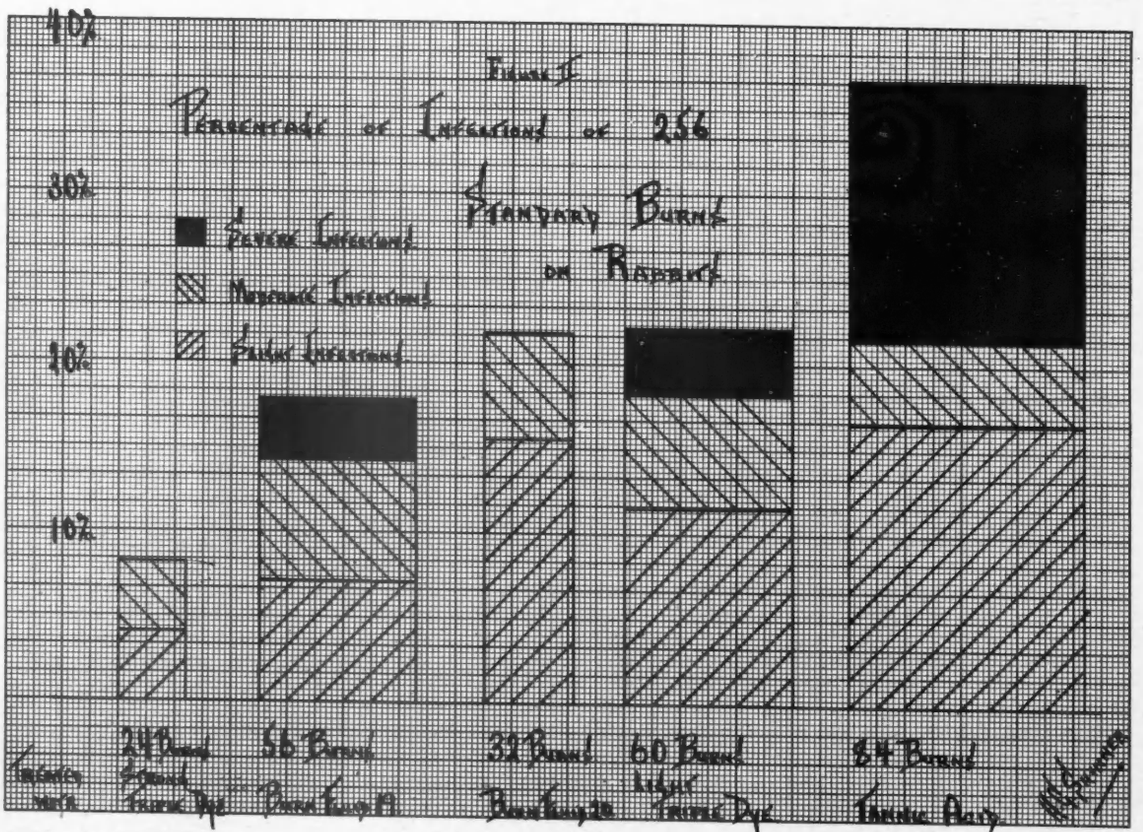

FIGURE 6.

PERCENTAGE OF INFECTIONS OF 256 SECONDARY BURNS ON RABBITS

cally the results shown in Table II. It shows the average number of days of healing for each type of treatment as well as the number of burns in each group. Table III gives the number and percentage of infected burns in each group, and classifies them as severe, moderate and slight. The classification is arbitrary; the severe infections were infected at 3 or more treatments; the moderate were infected at two treatments, while the slight infections were only found infected at one treatment. Fig. II is a graphic representation of Table III. It can be seen that strong triple dye had 8.2% of infection, burn fluid 19 had 17.8%, burn fluid 20 had 21.8%, light triple dye had 22.2%, and tannic acid had 36.8% of infection. Considering the classification of severe, moderate and slight, burn fluid 20 is better than burn fluid 19 and light triple dye by a small margin, although all three were inferior to strong triple dye against spontaneous infections.

The eschars formed by tannic acid and triple dye tend to crack. They are not as pliable as the eschars resulting from burn fluids 19 and 20. These latter solutions produce a smooth, shiny flexible eschar that does not crack.

Tannic acid and triple dye produce eschars that are difficult to remove. Practically always an attempt at removal results in damage to the underlying wound. This difficulty was overcome during the present study by cutting small "windows" to observe healing, thus protecting most of the area from the damage of eschar removal.

Burn fluids 19 and 20 are both water-soluble. Thus their eschars were readily removed after soaking for a few minutes with a warm saline solution. Removal never resulted in damage to the underlying tissue. These fluids did not appear to stimulate granulation tissue, although the speed of epithelization was apparently increased.

DISCUSSION

This method of producing standard burns on animals offers a technique that can be applied to numerous burn and other wound problems. The healing power of each ingredient of each preparation used should be evaluated against the accepted treatments of the day or against untreated burns. In this way every ingredient can be assessed and a better understanding of the best concentrations and combinations can be discovered. Hunches and pet treatments can be quickly substantiated or discarded, so that no time will be wasted on the discussions of relatively useless burn treatments.

We do not claim that the experimental burns used are identical or even approach the human burn, but this method gives results regarding the healing ability of burn treatments that seem important. Living mammalian tissue was used, and although the healing time will vary from species to species, the relative merit of the treatment regarding healing time should remain the same. This method demonstrates the significant differences in healing time of standard burns treated by various methods. This type of control cannot be approached by investigators using clinical cases on a scale that yields statistically significant results.

Wounds treated with burn fluids 19 and 20 healed many days sooner than wounds treated by other methods. The anti-infective ability of strong triple dye solution is upheld. This favourable finding cannot, however, overcome the adverse effect of strong triple dye solution on healing time.

Burn fluid 19, although resulting in fewer infections than burn fluid 20, had many more severe infections, so it would appear that burn fluid 20 is of more value against infections than burn fluid 19. This result may be due to the phemerol contained in the former solution. Weak triple dye or tannic acid are not so effective as burn fluid 19 against infection.

Burn fluid 19 and burn fluid 20 were more easily applied and gave a very satisfactory eschar. Easy removal of the eschar was accomplished without damage to the wound surface. All the other methods caused damage to granulation and epithelium on removal of the eschar.

SUMMARY

1. A new method of producing experimental burns on animals is described. A total of 256 burns were studied.

2. The healing time of standard burns treated with two new burn fluids, burn fluid 19 and a slight modification, burn fluid 20, was compared with the healing time of similar standard burns treated with tannic acid, weak triple dye, and strong triple dye solutions.

3. It was demonstrated that the burns treated with burn fluids 19 and 20 healed in a shorter time than did the burns treated by the other methods.

4. Strong triple dye solution had fewest infections. Burn fluids 19 and 20 have a greater

anti-infective ability than weak triple dye or tannic acid.

5. Burn fluids 19 and 20 were easily applied and as they are water-soluble their eschars were readily removed.

6. The eschars resulting from the use of burn fluid 19 and burn fluid 20 were superior in flexibility to the eschars resulting from the application of tannic acid and weak and strong triple dye solutions.

7. It has been demonstrated in 229 non-infected experimental burns on rabbits that burn fluids 19 and 20 are superior to tannic acid, weak and strong triple dye in healing power and eschar formation.

We wish to take this opportunity of thanking the National Research Council for supplying the funds to make this work possible; Dr. G. A. Ramsay for his co-operation; Dr. Sivertz for supplying burn fluids 19 and 20, and Drs. L. D. Ruttle and H. W. Boyes for technical assistance during part of these experiments. Special thanks are due to Mr. D. E. Crinklaw for excellent technical assistance throughout the work.

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THE ROYAL CANADIAN NAVY COLOUR VISION TEST LANTERN*

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Toronto

THE ability to make normal differentiation of observed colours is an important physiological requirement in certain branches of the three fighting services. Such normal colour vision is an essential for most of the sea-going personnel in the Naval Service. The most widely used test of colour vision is the Ishihara or pseudo-isochromatic test. This test is very rapid, but has the disadvantage that it is too sensitive and, as will be explained, we believe it excludes subjects with no real defect in colour vision. As the Ishihara test is rapid and errs on the side of severity it makes an ideal *initial* sorting procedure. The lantern to be described is used for the further sorting of subjects who fail on the Ishihara test.

The Royal Canadian Navy colour vision test lantern was developed by one of us (D.Y.S.) under the auspices of the Subcommittee on Naval Medical Research of the National Research Council and the Medical Research Unit of the Royal Canadian Navy. It is now authorized for use by the Royal Canadian Navy. In designing this lantern we have made extensive use of the reports of the Committee on the Physiology of Vision of the Medical Research Council,[1] which have supplemented our own observations. We are also indebted to the designers of the British Board of Trade Lantern.[2]

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CONSTRUCTION

The lantern shows two horizontally disposed lights at one time. These are spaced 1" apart, and a movable diaphragm makes it possible to use lights which are 0.2" in diameter or ones which are 0.02" in diameter. The large apertures are used only for demonstration and the small ones for test purposes. As a test instrument the machine would be perfectly satisfactory with a fixed diaphragm with the smaller apertures. As in the Board of Trade lantern, the lights, using the small apertures and viewed from a distance of 20 feet, give a dimensional representation of the riding lights of a vessel with a beam of 25 feet at a distance of 2,000 yards. This verisimilitude is probably of little importance. However, the simultaneous presentation of two colour stimuli, a condition frequently encountered on land and at sea, is probably a useful addition to any test and has the advantage of reducing the number of presentations required to derive a given quantity of colour-perception data.

Nine colour combinations can be shown. Each combination has been assigned a number as follows:—

Combination number	*Left*	*Right*
1	Green	White
2	Green	Green
3	Red	Green
4	White	Red
5	White (dim)	White (bright)
6	Red	White
7	Red	Red
8	Green	Red
9	White	Green

Different colours and combinations may be installed in the lantern and in this way the occupational requirements of any service or branch of a service can be provided for. The set-up as listed above has been found well suited to naval purposes.

All the filters are of polished pyrex glass. The green filter is the standard signal green (Corning No. 440) which has a fairly sharply peaked transmission at 0.480 μ (20% at 0.400 and 0.560 μ). The red filter is a deep red (Corning No. 241) which passes no appreciable amount of light of wavelength below 0.630 μ. A colourless polished pyrex glass (Corning

No. 774) is used for the white presentations. The neutral filters used for intensity adjustment consist of photographic film which has been given a carefully graded exposure, controlled development and thorough fixing and washing. Neutral glass filters of known density would be preferable, but could not be obtained. With the exception of combination 5 all the lights presented are adjusted by the use of neutral filters to appear of approximately the same brightness. This subjective equalization of intensity was checked by a number of observers on a standard lantern and then the same arrangement of pyrex glass and neutral filters assembled in all subsequent machines.

All the filter combinations are carried on an 8" cast brass wheel, the position of which is controlled by a large 9-sided knob on the rear panel. The combination numbers are stamped on the surfaces of the knob and the uppermost one is read. A spring-loaded roller positioning pawl ensures centring of the wheel in front of the viewing apertures. A single-blade shutter lies between the diaphragm and the filter wheel and is controlled by a lever on the rear panel. Light is seen only when the lever is depressed. Flashed opal glass is placed between the filter wheel and the light source, and this is mounted in a baffle which separates the source from the wheel, shutter and diaphragm. The introduction of this flashed opal diffusing glass does not appreciably affect the spectral characteristics of the test lights, although this is not true for some samples of milk glass under certain conditions. All metal parts are painted a dull black.

The light source is a single-filament 32 candle-power prefocussed automobile headlight bulb with current provided by an 8-110 volt 25-60 cycle transformer. This transformer also supplies two shielded flood-lights on the rear panel. The intensities of the main light source and of the flood-lights can be separately controlled by rheostats. A switch which is inserted in the primary circuit of the transformer is mounted on the rear panel.

The red component in the light from an incandescent electric lamp becomes proportionately greater as the filament temperature is reduced. For this reason most colour vision test lanterns have been provided with some means of ensuring a relatively constant filament temperature. Specially aged lamps have been used with a meter and rheostat provided to permit adjustment of filament current to a predetermined value. Such lamps are usually changed after being used for a certain length of time.

In the present lantern a photovoltaic (photronic) cell and shunted microammeter have been employed for adjusting colour temperature. An incandescent lamp shows a complex interrelationship between colour temperature and intensity, and an increase in either will increase the output of a photocell. However, in an experimental set-up permitting correction for the intensity change it was found that alterations in photocell output over the range used were chiefly due to colour temperature changes. Obviously a cell showing as little sensitivity as possible at the red end of the spectrum should be used for detecting such changes in colour temperature. In practice it was found that a meter reading of 125 corresponded to a filament colour temperature of approximately 2,700° K, of 150 to 2,800° K and of 175 to 2,900° K. Rheostat adjustment of filament current could be made with accuracy sufficient to give a photocell meter reading of $\pm$ 3 over this range. This control over colour temperature of the test light source has proved quite satisfactory in actual operation.

In the "Modified R.C.N. Lantern" the photocell and microammeter are eliminated. An ammeter is connected in series with the light source and the rheostat adjusted to give a reading of 3.8 ampères. With a new bulb this corresponds to a colour temperature of about 2,800° K. This method of adjustment of colour temperature is not so precise as that utilizing the photocell, nor does it correct for aging of the bulb.

The photocell set-up actually used in the R.C.N. lantern employs a Weston No. 594 BB photocell mounted 4 inches from the light source to the side and a little to the rear of the bulb. This operates a 200 microampère meter shunted by a 500 Ω wire-wound resistor. A switch to break this circuit when the adjustment has been made is mounted on the rear panel. The rheostat controlling the intensity of the light source is adjusted to give a reading of 150 microampères. Due to the shunt, this does not represent the true current in the photocell circuit but is proportional to it. This adjustment is checked before each subject is tested.

The whole machine is housed in a wooden case which is painted a dull black. The case overhangs the rear control panel and shields the subject from the dim flood-lights provided to illuminate the controls and facilitate making records. The lantern case has been made sufficiently large that the need for a special booth for recording results has been eliminated.

Fig. 1 shows the lantern in use and the drawings in Fig. 2 illustrate the constructional features of the lantern.

METHOD OF TESTING

An Ishihara colour-vision test is performed on all persons under investigation. The abridged Ishihara book with 11 test plates is used. The plates are presented to the subject in varying sequence and are placed 3 feet in front of the subject at eye level. Illumination is provided by two 100 watt daylight bulbs in reflectors. These lamps are placed 4 feet from the chart, 3 feet apart and at chart level. Thus there is illumination from two directions, which reduces

Fig. 1.—Colour vision test lantern in use.

the possibility of colour confusion due to spectral reflection. Any such dual illumination could be used but should be standardized to facilitate the comparison of results. One mistake entitles the subject to a retest. Two or more mistakes or the repetition, on retest, of one mistake justifies the classification of the subject as an Ishihara-failure. All Ishihara-failures are given the lantern test.

For the lantern test a dark room is desirable but not essential and the test may be performed in a room with ordinary opaque window shades. The subject is given a dark adaptation period of at least 10 minutes in a room which is as dark as the one to be used for the test. He is then led, by an attendant provided, if necessary, with a dim red flashlight, to a chair 20 feet from the lantern and placed exactly in line with the front aperture of the lantern. The lantern rests on a table of normal height and of size sufficient to permit a record sheet to be placed under the flood-lights at the rear of the machine (Figs. 1 and 3). If a dark room of over 20 feet in length is not available a mirror may be used. In this case the mirror is placed 10 feet from the lantern, and the subject is seated beside the lantern as shown in Fig. 3. In recording the combinations the operator must remember that they will appear reversed as to position when the mirror is used. One doctor with one lantern and one helper can handle 10 men an hour. The men are usually dark-adapted in groups of 10.

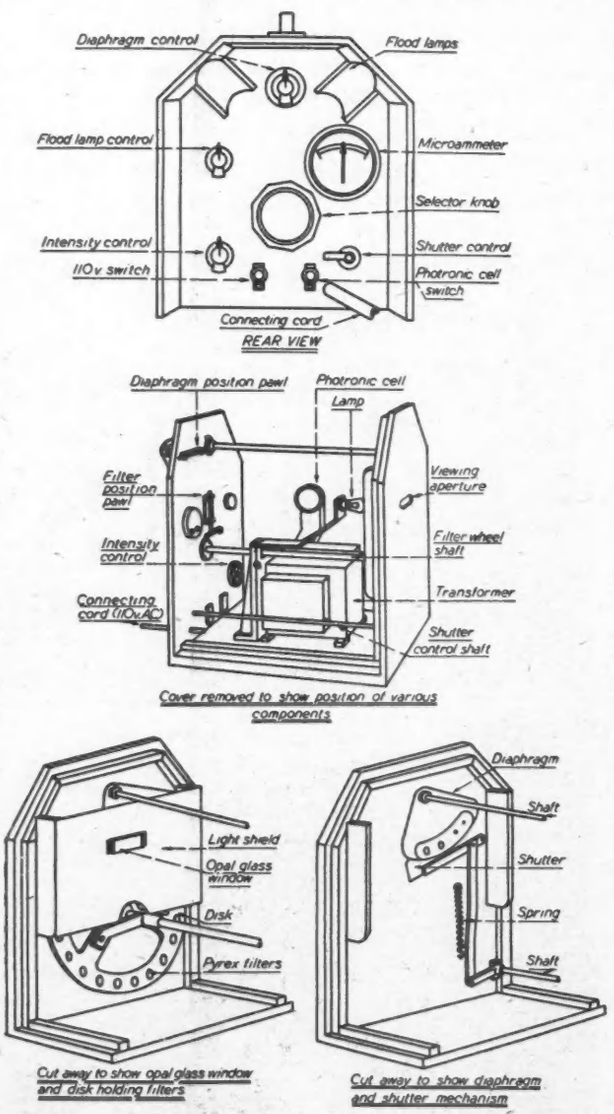

Fig. 2.—Constructional details of the Royal Canadian Navy colour vision test lantern.

The subject is instructed to name the colours seen from left to right and at the same time raise the appropriate hand. Thus a response might be "left (left hand raised) red, right (right hand raised) green." Prior to the test the subject is told that the colours are simple, pure colours and that they should be named accordingly (*i.e.*, say red—not maroon, rose, pink, etc.). The helper in charge of the subjects stands behind the subject with one hand placed lightly on each of the subject's shoulders and reports any miscalling of hands.

The doctor operating the lantern must keep the record sheet and his hands well shielded by the lantern. The flood-lights should be as dim as is convenient. The test-light intensity is adjusted to give a photocell reading of 150 microampères. The small apertures are used throughout. Test presentations are usually started with combination 3 or 8 and the rotation of the filter wheel proceeds clockwise or anticlockwise from the starting point. Combinations 4, 8 and 9 are each repeated once, in varied order, at the end of the test. Variation of the starting point, direction of rotation, and order of the final three combinations provide ample opportunity for avoiding any rhythm in the presentation of the colour combinations. The shutter is held open as long as is required by the subject.

If the subject makes a mistake in describing only one combination this may be repeated several times, suitably mixed with other combinations, at the end of the test. If time does not permit such an extension of the test a single failure is ignored.

EVALUATION OF TEST

If only one mistake is made this is to be ignored or retested as described above. Two

mistakes are held to justify classification according to the mistakes.

Classification: *Group 1.*—Personnel who perform a perfect Ishihara test. *Group 2.*—Personnel who fail on the Ishihara test, but perform a perfect lantern test. *Group 3.*—Personnel who misinterpret the green and (or) white stimuli. *Group 4.*—Personnel who misinterpret the red stimuli.

A subject should be classified according to his worst error. If there is only one such error it is advisable to grant several retrials on this combination.

RESULTS

As stated previously all subjects are made to perform the Ishihara test and if they pass no further colour vision test is performed. It is thought that many of those failing on the Ishihara test do so not due to a colour-perception deficiency but rather to some deficiency in the integration of multiple colour stimuli. This type of subject fails to see the required figures on the test plate, but can name the colour of any of the individual dots promptly and accurately. Such subjects pass the lantern test perfectly, thus falling in group 2. These subjects are treated as having normal colour vision as far as naval work is concerned.

A large percentage of those included in group 2 probably have strictly normal colour vision, but a number in this group are certainly anomalous trichromates with a degree of defect so slight that it does not interfere with the recognition and differentiation of red and green. Group 3 includes anomalous trichromates with a marked deuteranomaly and also the so-called "green-blind" dichromates (deuteranopes). Group 4 includes anomalous trichromates with a marked protanomaly, the "red-blind" dichromates (protanopes), the rare monochromates (completely colour blind) and subjects with so-called "shortening of the red end of the spectrum." As the red filters used pass only the longer wave-lengths of red light these latter rare but occupationally dangerous subjects who fail to detect or identify the long wave-length red will fall in group 4 and test like protanopes. If a red filter passing shorter wave-lengths was used such personnel would identify the colour correctly and no defect would be detected.

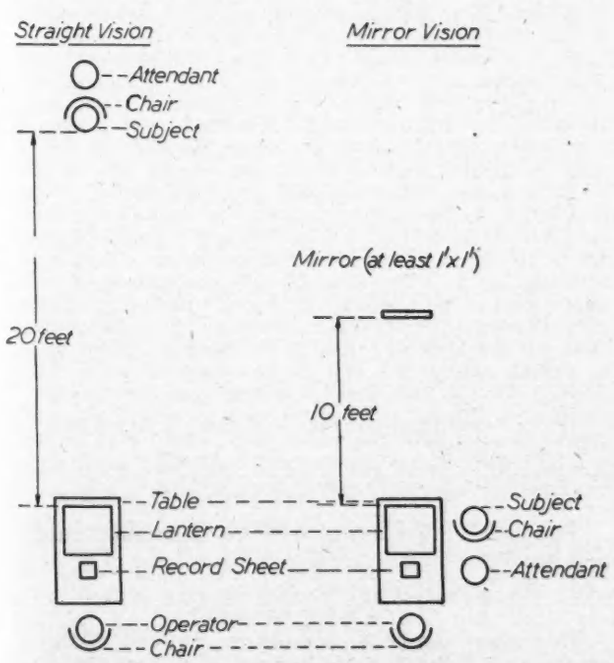

Fig. 3.—Dark room layout for colour vision test.

It will be seen that our system of grouping is based on occupational requirements and not on the conventional classification of colour vision defects. Group 1 includes personnel with no detectable deficiency in colour perception. Group 2 embraces subjects with slight or bizarre deficiencies of no occupational importance. Group 3 includes those with deficient perception of green, and group 4 those with deficient perception of red. The deficiency may be due to any one of a number of clinically identifiable conditions as enumerated above. There would appear to be no object in making this identification in a sorting procedure designed to indicate occupational usefulness.

In testing 1,200 male subjects (18 to 30 years of age) 74 (6.2%) failed the Ishihara test. Of these 29 (2.4% of total) were group 2, 25 (2.1% of total) were group 3 and 20 (1.7% of total) group 4.

SUMMARY

The construction of the Royal Canadian Navy colour vision test lantern is described. Test procedures are outlined and the evaluation of data thus obtained is discussed.

We should like to express our appreciation of the essential support given to this work by Surgeon Captain A. McCallum, R.C.N.V.R., Director General of Medical Services—Naval. Invaluable help in the construction of the apparatus described was given by Messrs. F. L. Robinson, J. D. Brown, A. Elliott and G. Eidt.

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A COMPLICATION OF MUMPS—SWELLING OVER THE MANUBRIUM STERNI

BY FLT. LIEUTENANT CHARLES S. BARKER

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IN a recent epidemic of mumps a striking swelling was seen over the region of the manubrium sterni in three of a series of 438 cases. This swelling was well marked in two cases, and was slight in a third. A search of the commonly used textbooks in medicine failed to reveal a description of this complication. The only reference found was that of Radin[1] in 1918. The following is a quotation from his paper.

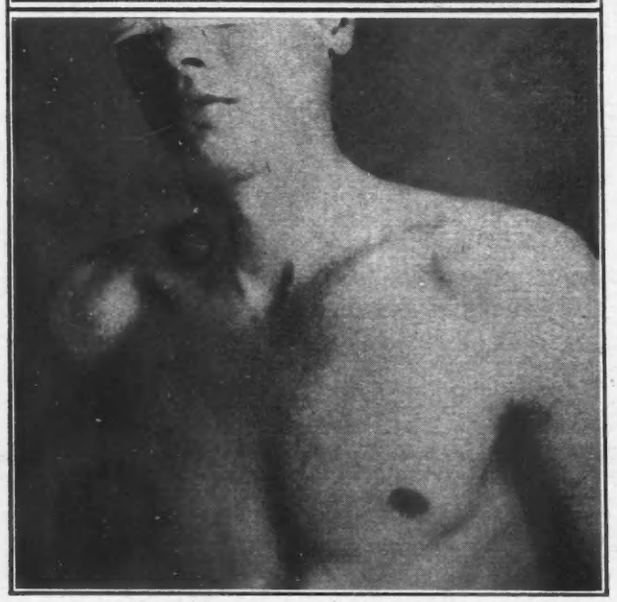

Fig. 1. (Case 1).—Photograph taken when presternal swelling was at its height. **Fig. 2.** (Case 1).—Photograph taken prior to discharge showing subsidence of swelling.

"Finally there are a few cases in which mumps expresses itself by a general swelling of the neck and chest like Hodgkin's disease, a doughy gelatinous mass. Cases of this sort have been noted by Lieutenant Hathcock and Lieutenant Grover. There is no tenderness. The tissues are soft and elastic and are easily agitated. Major Sailer has called attention to a case of possible thymus enlargement. There was some swelling pre-sternally and also in the tissues of the neck. There was alteration in the percussion note over the manubrium on change of position of the head, tympany being present when the head was drawn back and dullness when it was brought forward. The skin showed slight œdema which Major Sailer attributed to cutting off the lymph supply by the inflamed thymus. Roentgenograms showed a shadow behind the upper part of the sternum which Major Wheat interpreted as an enlarged thymus."

The presternal swelling is considered of sufficient interest to be described further.

CASE 1

Male, aged 25, was admitted on May 25, 1942, with mumps. There was much enlargement of the right parotid gland, and moderate enlargement of the left parotid gland. The neck had a full appearance. The findings were otherwise negative. The enlargement of the glands persisted on the 26th and 27th. On the 28th a swelling was noted over the manubrium sterni. This swelling did not pit very well, being more gelatinous in nature than most œdemas. It was not reddened and had a smooth roundness like a section of a sphere. The patient complained of some hoarseness of his voice and difficulty in swallowing. The consultant otolaryngologist made the following note in this connection: "There is œdema of epiglottis and the right lateral wall of the hypopharynx but very little of the larynx, though the latter could not be completely seen". On the 29th the patient stated that swallowing had improved, but he still felt he was a little hoarse. The parotid glands seemed a little smaller and the swelling over the manubrium had subsided considerably. On the 30th the glands seemed to be definitely subsiding, and the swelling was virtually gone. The rest of the convalescence was uneventful. The temperature curve was fairly typical of the more severe cases of mumps, the peak being 103° on the 26th and falling to normal by the 29th. A throat culture on the 27th showed a practically pure growth of *S. viridans*. A chest x-ray on the 28th showed no thymic or intra-thoracic glandular enlargement. On the 29th the white blood count was 11,200, and the differential was normal. On the same date the sedimentation rate was 6 mm. per hour.

The other two cases will be described more briefly.

CASE 2

This man, aged 28, showed a marked bilateral parotitis with much swelling of the neck to the sternum. Soon after admission a swelling appeared over the manubrium. This was even larger than in

Case 1. It seemed to shift somewhat with gravity as he sat up or lay on one side or the other. The swelling was accompanied by dysphagia and lasted about 5 days.

CASE 3

Male, aged 19. A more moderate case of mumps. The swelling over the manubrium lasted about one day and was smaller than in either of the other cases.

The swellings in these three cases were very similar in nature. They lacked the inflammatory characteristics of a cellulitis. The cause of this swelling invited considerable speculation. There was nothing to suggest a venous blockage, nor did it seem possible that there might be glandular nests or anomalies in this region, which might be involved by the mumps infection. The most obvious reason seemed to be a lymphatic blockage involving the neck and this area of the front of the chest. Confirmation of this appeared to lie in the fact that the swellings disappeared fairly rapidly. Under Hodgkin's disease, Tice's "Medicine"[2] states that œdemas may occur due to pressure: "The lymphatic circulation is also frequently affected by pressure, leading particularly to œdema of the chest wall in the region of the sternum and mammary glands, and of the neck and face when a growing cervical mass is the cause." Our cases were not marked however, by any very noteworthy swelling of the lymphatic glands of the neck. A cellulitis of the deeper neck tissues in front of the pre-tracheal fascia might conceivably lead to the lymph blockage.

A point of interest in the first case was the œdema of the epiglottis and right lateral wall of the hypopharynx. The sequence of events may be somewhat similar to that noted in Ludwig's angina,[3] "The infection may pass around the mylohyoid muscle and involve the structures around the base of the tongue and produce œdema of the larynx and death."

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DEATH FOLLOWING SULFATHIAZOLE THERAPY*

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FOLLOWING the preparation of sulfathiazole by Fossbinder and Walter[1] in 1939, extensive animal experiments on the toxicity of this drug were carried out by numerous investigators.[2] The results of these investigations suggested that under ordinary dosage sulfathiazole was less toxic than sulfapyridine and attention was focused upon the renal damage caused by the former. The renal lesions consisted primarily of the presence of concretions in the renal tubules, pelves and urinary bladder. Occasional atrophic changes in the Malpighian corpuscles of the spleen were noted and one animal showed a focus of necrosis in the liver.[2a]

Although the toxic effects of sulfathiazole on the kidneys of man are well known,[3] with transient manifestations such as nitrogen retention, hæmaturia, oliguria and the presence of sulfathiazole crystals in the urine, little attention has been paid to the toxic effects of sulfathiazole in man upon organs other than those of the urinary tract.

Hoyne and Larrimore,[4] in reporting the first case of death following sulfathiazole therapy, suggest a toxic effect upon the bone marrow with death resulting from acute agranulocytosis. Their autopsy findings are scanty but, "distinctive cloudy swelling of the myocardium, liver and kidneys" is mentioned.

Recently, Lederer and Rosenblatt[5] reported a series of four cases, complete with autopsy, in which death was, in all probability, due to sulfathiazole. This excellent study clearly demonstrates the toxic, pathological effects of sulfathiazole on organs other than those of the urinary tract and suggests that in man, at least, widespread necrotic lesions, differing from those found in experimental animals, are caused by sulfathiazole. While this paper was being written, an additional four cases were reported by Merkel and Crawford.[6] The pathological changes described by these authors are identical with those described by Lederer and Rosenblatt.[5]

Prior to the appearance of Lederer and Rosenblatt's report, we had the opportunity of following a case under sulfathiazole therapy which terminated fatally and in which an

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autopsy was performed. The anatomical findings at autopsy were interpreted by us as due to sulfathiazole intoxication.

CASE REPORT

History.—D.R., a 44-year old, white, Jewish male was admitted to the surgical service of the Jewish General Hospital on February 20, 1942. For five days prior to admission he had complained of pain in the region of the rectum, so severe that he could not sit down. A physician, called to his home, applied hot dressings to the peri-anal region and prescribed sulfathiazole gr. 15 (1 grm.) every four hours. The patient took a total of 60 grains (4 grm.), after which the sulfathiazole was discontinued. The patient continued to receive hot applications to the perineum and was recommended to the hospital for incision and drainage of ischio-rectal abscesses.

The past history revealed that the patient had had lobar pneumonia in 1940 for which he received a total of 135 gr. of sulfapyridine. At that time he showed no toxic reactions and made an uneventful recovery.

Physical examination.—On admission his temperature was 100.2° F.; pulse rate 88; respiratory rate 22; and blood pressure 94 systolic and 52 diastolic. On either side of the anus large, red, slightly indurated and somewhat fluctuant areas were palpable. The balance of the physical examination revealed no significant findings. His blood count was 12,000 white blood cells. A voided specimen of urine was slightly turbid and showed a slight trace of sugar.

A preoperative diagnosis of ischiorectal abscesses, bilateral, was made and he was operated on the day of admission. The main abscess was in the left ischiorectal space, but upon incising this space a communication was found posterior to the rectum which extended into the right ischiorectal space. Both spaces were incised widely. A great deal of thick, green pus was obtained which upon culture yielded *B. coli*. Rubber drains were inserted. The patient was returned from the operating room in good condition and placed upon sulfathiazole 15 gr. every four hours.

His temperature rose to 101° F. on the first postoperative day and returned to normal on the second postoperative day, where it remained till the sixth postoperative day, at which time the rubber drains were removed from the perineum. On the third postoperative day his A.C. blood sugar was 133 mgm. per 100 c.c. of blood and his P.C. sugar was 200 mgm. He was placed on a 1,750 calorie diet with 20 units of protamine zinc insulin daily. Up to the sixth postoperative day the patient received 180 gr. of sulfathiazole.

Following removal of the drains his temperature rose to 104° F. and sulfathiazole was discontinued. For the next 24 hours his temperature fluctuated between 104.4° and 100.8° F. On the seventh postoperative day, after his temperature had dropped to 100.8°, sulfathiazole, gr. 15 every four hours, was again ordered and after the second dose, the patient developed a chill lasting one-half hour and his temperature rose to 102°. His white blood cell count at this time was 12,000, and a blood culture taken on this day proved to be sterile. His fasting blood sugar was 113 mgm. per 100 c.c. of blood. Four hours later (the morning of his eighth postoperative day) his temperature had risen to 105° F. Two further doses of sulfathiazole 15 gr. each were given during the day and late in the evening of the eighth postoperative day he became restless, irrational, and developed incontinence.

On the ninth postoperative day the temperature continued to fluctuate between 102.2 and 104.3°. Sulfathiazole was again discontinued and 10% intravenous glucose-saline was started. The patient continued to be irrational and was placed on the danger list. On this day his intake was 1,530 c.c. and he passed a small quantity of urine.

On the tenth postoperative day, the temperature fell markedly, reaching 96.5° and stayed well below 98°, with occasional spikes to 104.2°. His intake was 3,250 c.c. and output 200 c.c. He was given two blood transfusions of 250 c.c. of whole blood and 5,000 c.c. of 10% glucose intravenously. His respirations were laboured; he was hiccoughing and incontinent. On this day he was given 5 c.c. of cibazal (soluble sodium sulfathiazole) intramuscularly. The abdomen was distended and the liver was palpable. His urine had a specific gravity of 1.010, and showed 2+ albumin and occasional casts and red blood cells. His blood count showed 4.9 million red cells, 96% hæmoglobin, and 9,200 white blood cells. A blood culture taken on this day proved to be sterile. Chemical examination of his blood showed 63.0 mgm. non-protein nitrogen, 5.7 mgm. creatinine, 150 mgm. sugar, and a sulfathiazole level of 7.0 mgm. per 100 c.c. of blood.

On the eleventh postoperative day his temperature varied from 96.6 to 100° F. His intake, consisting largely of 10% intravenous glucose, was 3,680 c.c. and his output was 930 c.c. He continued to spill 2+ albumin in his urine with occasional hyaline and granular casts. No sulfathiazole crystals were found in the urine. His non-protein nitrogen rose to 80 mgm. and his creatinine to 7.4 mgm. per 100 c.c. of blood. On this day an erythematous rash was noted on his face and body. The patient continued to hiccough and was restless. He received a transfusion of 250 c.c. of whole blood. His breathing was laboured, his abdomen was distended, and during the night he was placed in an oxygen tent. His pulse rate varied between 120 and 140 per minute and his blood pressure was 140/40.

On the twelfth postoperative day an icteric tinge was noted in the scleræ. The icteric index was 20 units and the non-protein nitrogen and creatinine had risen to 100 mgm. and 7.95 mgm. per 100 c.c. of blood, respectively. His intake, consisting largely of intravenous glucose, was 2,100 c.c. and his output was 775 c.c. His urine showed 2+ albumin, occasional red blood cells and a few granular casts but no crystals were present. The patient alternated between restlessness and drowsiness.

On the thirteenth postoperative day his temperature varied between 98 and 102° F. He was hiccoughing. His intake (20% intravenous glucose in sterile water) was 2,630 c.c. and his output was 650 c.c. On this day moist râles were heard over the lung bases posteriorly, together with bronchial breathing. His non-protein nitrogen rose to 108 mgm. per 100 c.c. of blood and his creatinine remained at 7.95 mgm. The icteric index was 21 units. The direct van den Bergh was 2.21 mgm. % and the indirect 3.03 mgm. % with a D/I ratio of 72.9%. The carbon dioxide combining power was 45.7 volumes %. The patient coughed and spat blood-stained sputum and remained in the oxygen tent. The urine still failed to show sulfathiazole crystals.

On his fourteenth postoperative day he showed severe respiratory distress and was markedly cyanosed. He hiccoughed and was distended. He coughed and brought up considerable green-tinged sputum. His non-protein nitrogen rose to 120 mgm. per 100 c.c. of blood, and he died on the afternoon of his fourteenth postoperative day.

POST MORTEM EXAMINATION

A complete examination of the thorax and abdomen was made five hours after death. There was questionable icteric tinting of the scleræ and the mucous membranes were cyanotic. The edges of the perineal incisions showed a slight grayish-green discoloration, but no pus was present and the walls and bases were smooth and clean, showing healthy, red, granulation tissue.

Heart.—Showed no gross pathological changes, and culture of the heart's blood yielded no growth. *Lungs.*—The lower lobes were distinctly and irregularly consolidated and dark violet in colour. Section revealed a number of rather sharply defined, elevated, firm, gray, granular areas measuring 4 to 5 cm. in diameter, some of which were confluent. The surrounding lung tissue was red and moist. From these elevated areas *Staph. aureus hæmolyticus* was cultured. *Liver.*—The liver was

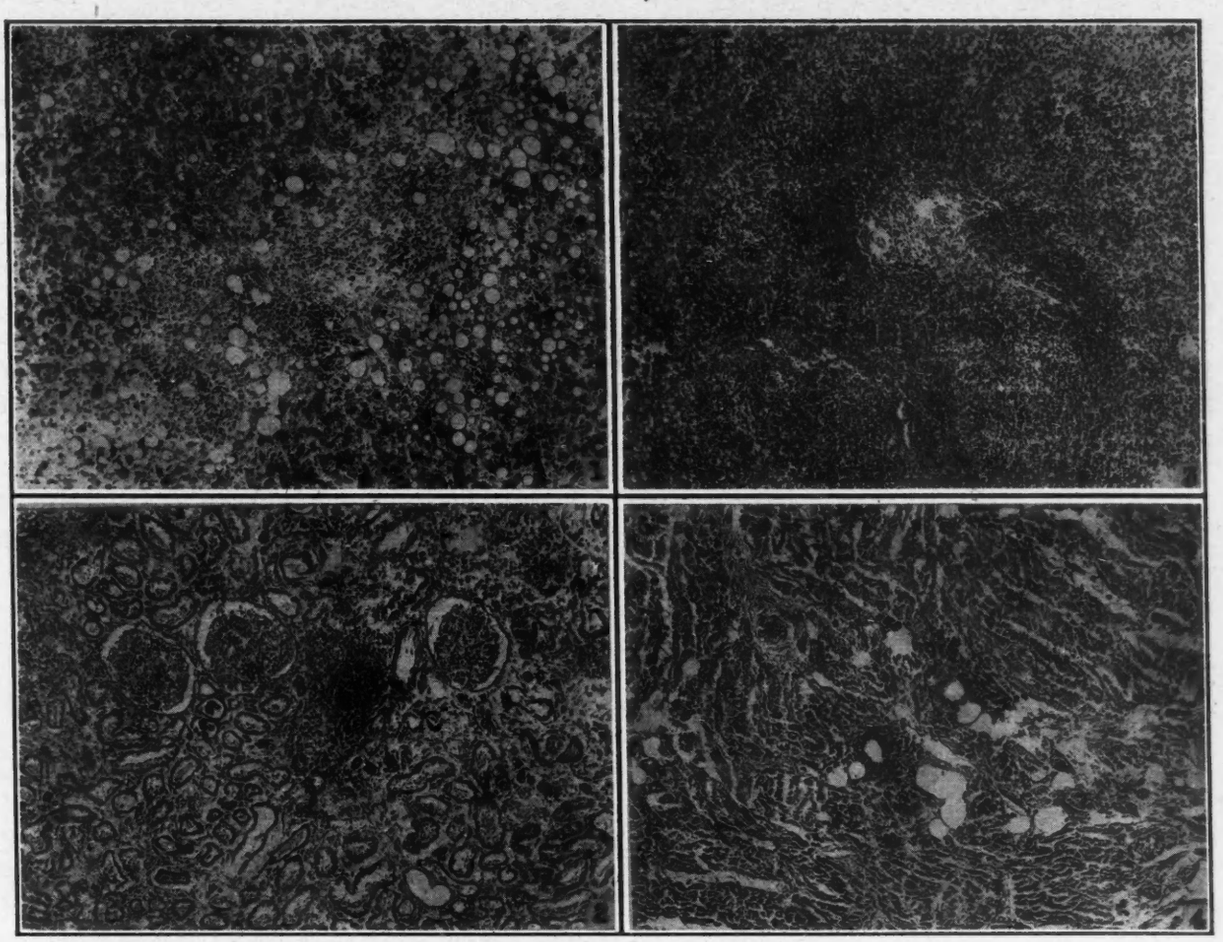

Fig. 1.—Liver showing two foci of necrosis with infiltrating round cells. **Fig. 2.**—Kidney showing marked tubular degeneration, interstitial œdema and focal necrosis infiltrated by round cells. Note the dark-staining sulfathiazole concretions in the tubules under the two glomeruli to the left. **Fig. 3.**—Focal necrosis involving central portion of Malpighian corpuscles of spleen. **Fig. 4.**—Myocardium showing foci of necrosis and mild interstitial myocarditis.

definitely enlarged and weighed 3,140 grm. The colour was yellowish-brown. The capsule was tense and the edges rounded. The cut edge bulged and the cut surface showed no accentuation of vascular markings, but a peculiar red and somewhat translucent mottling was noted in various portions of the lobules. *Spleen.*—The spleen was enlarged and weighed 480 grm. The pulp was dark red, diffluent and the Malpighian corpuscles were prominent. *Kidneys.*—Both kidneys were enlarged, the right weighing 310 grm. and the left, 330 grm. The organs were flabby. The capsule stripped with ease and revealed a smooth, gray outer surface in which a few small retention cysts were present. The cut edge bulged and the cut surface was moist and gray. The cortex was of average width, but the medulla was somewhat more prominent and distinctly more gray in colour than normal. Cortical striations were present but blurred. The pelves were of average size and shape and lined with gray mucous membranes that showed a few bright red, punctate hæmorrhages less than 1 mm. in diameter. No crystals were present. The urinary bladder contained 25 c.c. of turbid urine, but the mucous membrane was not remarkable.

Microscopic examination: *Heart.*—Section of the left ventricle showed small foci of necrosis in the subepicardial fat which were infiltrated by small numbers of round cells and occasional polymorphonuclear leukocytes. No similar lesions were seen within the myocardium.

Section of the right ventricle showed several foci of necrosis within the myocardium which were infiltrated by lymphocytes and rare polymorphonuclear leukocytes. Such foci were quite irregular in distribution, small in size and failed to show bacteria. *Lungs.*—Sections of both lower lobes showed the majority of the alveoli to be filled with an exudate consisting of red blood cells, polymorphonuclear leukocytes and lymphocytes. In many situations within the exudate small, blue-staining masses of cocci were noted. These, upon culture, were proved to be *Staph. aureus hæmolyticus.* No abscesses were present and no necrosis of the exudate or alveolar walls was seen. *Liver.*—Three sections of liver showed in all a most unusual picture, characterized by multiple foci of granular necrosis. These foci of necrosis were for the most part found near central veins, although not infrequently they were present in the mid-zonal and peripheral portions of the anatomical lobules. These foci of necrosis failed to show the presence of bacteria and were infiltrated with small numbers of lymphocytes and rare polymorphonuclear leukocytes. Near each focus of necrosis the adjacent liver cells showed marked vacuolization and within many of these vacuoles biliary pigment was present. No replacement by fibrous connective tissue was seen, but evidence of regeneration, as indicated by the prominent staining of nuclei and the presence of multiple nuclei within the liver cells, was noted. Occasional lymphocytes and rare polymorphonuclear leukocytes were noted in the peri-portal spaces. The entire picture was that of a widespread and irregularly distributed type of focal necrosis of some duration in which attempts at repair were seen. The distribution of these foci of necrosis, their large numbers, the absence of bacteria, and the small amount of exudate suggested a chemical type of injury.

In other situations in the liver there was moderate œdema of the tissues between the liver cell cords, and Kupffer cells appeared slightly more prominent than usual. *Spleen.*—Two sections of the spleen showed considerable hyperæmia of the pulp and slight prominence of the Malpighian bodies. Rare foci of necrosis were noted in the Malpighian bodies, but there was no increase in the number of polymorphonuclear leukocytes in the pulp. An occasional nucleated red blood cell was seen within the pulp. *Adrenals.*—Rare, spotty foci of necrosis were seen in the deeper layers of the cortex involving a few cells, and in one section in the periadrenal fat a small focus of necrosis, similar to that described in the subepicardial fat, was seen. *Kidneys.*—Two sections of kidney showed a most unusual picture. In each kidney there was considerable damage to the tubular epithelium. This consisted primarily of granularity, swelling, and desquamation of the tubular epithelium with occasional tubuli showing loss of nuclei of lining cells. Within a few tubuli peculiar, spherical, reddish-brown, crystalline structures were noted. These took an irregular stain, being reddish-brown in the centre and somewhat blue in colour in the peripheral portions. The crystals appeared to be radially arranged. Such crystals, though few in number, were found predominantly in convoluted tubules and their exact chemical nature could not be determined. In the collecting tubules many granular and occasional hyaline casts were seen, a few of which showed enmeshed polymorphonuclear leukocytes. Also within the collecting tubules there was some tendency toward regeneration of lining cells, as indicated by the staining quality and stratification of the cells.

The glomeruli presented an interesting change which consisted predominantly of marked hyperæmia of the capillaries and the presence of considerable amounts of albuminous material within the subcapsular spaces. Interstitially focal areas of necrosis were encountered which were infiltrated by small numbers of lymphocytes and polymorphonuclear leukocytes. Such areas were usually in proximity to tubules the epithelium of which was necrotic. No abscesses were present and no bacteria were seen.

Surgical operative site.—Section taken from the edge of the surgical sinus in the perineum revealed the sinus tract to be lined with clean granulation tissue, containing a sparse infiltration of lymphocytes and rare polymorphonuclear leukocytes. The granulation tissue did not extend deeply into the subcutaneous tissue and no abscesses were present. Near the skin surface a few cocci were noted.

SUMMARY

A middle-aged man who had received sulfapyridine two years before and had tolerated the drug well was admitted for incision and drainage of ischiorectal abscesses after receiving 60 gr. (4 grm.) of sulfathiazole at home. After operation he received 180 gr. of sulfathiazole and suddenly developed a high fever (105° F.).

Following this episode sulfathiazole was discontinued, only to be given sporadically again over the next four days, an additional 60 gr. of sulfathiazole and 5 c.c. of cibazal (soluble sodium sulfathiazole) being given.

On his ninth postoperative day oliguria with azotæmia was noted. He became restless, hiccoughing and distended. His temperature fluctuated considerably, and his nitrogenous metabolites continued to increase in his blood. On the eleventh postoperative day he developed an erythematous rash on face and body and on the twelfth postoperative day developed icterus. In spite of discontinuance of sulfathiazole following the ninth postoperative day and with repeated blood transfusions, intravenous glucose and supportive measures, his oliguria persisted with albumin and casts in the urine and his non-protein nitrogen rose to 120 mgm. per 100 c.c. of blood. He died on his fourteenth postoperative day with signs of basilar bronchopneumonia.

The anatomical diagnosis was: extensive focal necrosis of liver (sulfathiazole); nephrosis (hepato-renal syndrome); staphylococcic bronchopneumonia involving both lower lobes; focal necrosis of myocardium, spleen and adrenal glands; intra-renal calculi of unknown type, presumably sulfathiazole.

COMMENT

The high fever, chill, and erythematous rash which occurred in this case after six days of sulfathiazole therapy are similar to the complications which have been reported by Finland, Peterson and Strauss.[7] These complications usually do not appear before the seventh day of therapy and differ from the sudden febrile reactions attributed to re-administrations of sulfathiazole, suggesting acquired sensitivity, as reported by Lyons and Balberor.[8] In their cases the febrile reactions occurred in 72 hours or less following the re-administration of the drug. The oliguria and azotæmia have been adequately described,[3] but the icterus which occurred on the twelfth postoperative day in the present case has been, so far as the writers know, reported in only one other case[6] of sulfathiazole death.

While the report of the Council on Pharmacy and Chemistry on sulfathiazole[8] states that hepatitis, though rare, does occur, the basis for this statement is not apparent in their report. Rake *et al.*[2a] reported focal necrosis of the liver in only one mouse among their experimental animals. On the other hand, the toxic effects of sulfanilamide on the liver are well known[10] and, as has been demonstrated by Lederer and Rosenblatt,[5] Merkel and Crawford[6] and in the present reported case, there is no reasonable doubt that sulfathiazole also may produce severe and even fatal damage to the liver in certain individuals.

In the present case the damage to the liver was the most extensive found in any organ at autopsy. These foci of necrosis must be assumed to be due to a chemical substance inasmuch as

the bacterial stains on the liver were negative and both ante-mortem blood cultures and post-mortem blood culture were negative. The staphylococcic pneumonia was a terminal affair and in all probability did not account for the lesions in liver, kidneys, heart, spleen and adrenal glands. No abscesses were found in any organs.

The clinical picture in this case of diminished output of urine, gastrointestinal symptoms, lethargy alternating with restlessness and jaundice fits into the hepato-renal syndrome as described by Wilensky.[11] Thus also, at autopsy, the essential findings were degeneration of the hepatic cells and similar degeneration of the renal tubular epithelium.

The few, polychromic, crystalline structures found in some of the renal tubuli appear to be insufficient in number to explain the oliguria and nitrogen retention in this case upon an obstructive basis and no evidence of obstruction of pelves, ureters or urinary bladder was present at autopsy. Although the chemical nature of these crystalline structures was not determined, it is possible that they represent sulfathiazole combined in some peculiar way with inorganic material to render them insoluble in alcohol or xylol. The possibility that sulfathiazole itself acted directly upon the renal tubular epithelium, with subsequent necrosis, must be admitted, but this profound degree of degenerative tubular change has not been described in acute toxicity experiments, although it is a common finding following extensive liver damage.

The glomerular changes in the kidneys consisted primarily of altered permeability, with the presence of considerable amounts of albuminous material in the subcapsular spaces. Moderate œdema of the interstitial tissue of the pyramids and a focal round-cell infiltration appear to be part of the picture, and in this respect differs somewhat from those renal changes described in the hepato-renal syndrome.

Only a rare focus of necrosis was found in the Malpighian corpuscles of the spleen in the present case, but no foci of necrosis were seen in the exudate within the pneumonic areas in the lungs. The bone marrow was not examined. The foci of necrosis in the subepicardial fat and peri-adrenal fat seem to be part of the general necrotizing action of sulfathiazole and the focal necrosis of the myocardium and mild interstitial myocarditis is similar to that described by French and Weller.[12]

Thus, the pathological effects of sulfathiazole in certain individuals appears to be a widespread necrosis involving liver, kidneys, spleen, adrenals and other organs.[5, 6] In this case, as in other reported cases,[5, 6] the blood sulfathiazole levels were never excessive and the fatal outcome does not appear to be dependent upon the quantity of sulfathiazole administered. The factor of true drug sensitivity was not present in this case and was only seen in one case reported by Merkel and Crawford.[6]

CONCLUSIONS

1. A case of death following sulfathiazole therapy is reported which showed, at autopsy, extensive focal necrosis involving liver, kidneys, spleen, heart and adrenal glands. These lesions are, in all probability, due to the toxic action of sulfathiazole.

2. These toxic changes may occur even when the sulfathiazole blood levels are within the so-called "safe" range.

3. Urinary suppression should be closely watched for and any indication of diminished urinary output should be the signal for the discontinuation of sulfathiazole.

4. Jaundice due to liver damage may occur during sulfathiazole therapy.

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BRONCHOMONILIASIS

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DURING the routine periodic chest x-ray examinations of applicants and certified miners, for subsistence in a dust exposure occupation in Ontario, one chest plate showed the conspicuous shadows associated with active pulmonary disease due possibly to the tubercle bacillus, but there was something about the silhouettes not quite diagnostic of pulmonary tuberculosis. This chest plate (Fig. 1) was remarkable in that the multiple shadows were staining a pulmonary picture perfectly normal the previous year.

The plate was quite unusual in that the clinical manifestations camouflaged the severity of the condition as revealed by pulmonary x-ray shadows. It was only after persistent endeavour that the cause of the condition was found, convicted, and condemned. The evidence is best shown by a description of the case, and the course of the disease.

CASE REPORT

J.S., Canadian, aged 23 years, married, a solution man in a gold mine mill.

Family history.—Nothing noteworthy. Chest x-ray plate of wife was negative for pulmonary disease.

Past history.—No previous illness of importance.

Personal history.—Smokes fifteen cigarettes daily. Drinks tea, coffee freely. Excellent athlete.

Present illness.—Until February, 1940, his "wind" was excellent, at which time he caught a severe "chest cold" whilst on a vacation in Winnipeg. Cough and expectoration persisted for one month at that time. No pleurisy, sweats, or hæmoptysis. Since then he had gradually lost ten pounds; moderate increasing sense of fatigue, and for the past six months increasing shortness of breath on exertion. Recently, only, some aching discomfort felt over the left lower chest anteriorly, slight dry cough recently. Admitted to the Fort William Sanatorium on October 9, 1940.

Occupational history.—Six months underground as a trammer in a gold mine during 1935, followed by six months as ball-mill operator (wet grind). For the past three years he had been employed as a solution man in gold mine mill.

Physical examination.—Showed a healthy-looking young man, well nourished, of athletic build; height 5′ 11″; weight 180 pounds. The upper chest was somewhat hyperresonant bilaterally, with impairment of resonance towards the bases, particularly on the left side. The respiratory murmur is fair throughout both lungs. Chest measurements: full inspiration 41½″, full expiration 39½″. Scattered moist râles were heard over the base of both lower lobes extending well into the interscapular region bilaterally. A few crepitations were heard in the left pectoral region. The pulse rate and respirations were not increased. The temperature was normal. There were no oral or cutaneous manifestations.

Chest x-ray plate (Fig. 1), September 16, 1940.—The heart was somewhat enlarged to the left. The leaves of the diaphragm were smooth, no sinuosities present; the sulci were apparently free of adhesions, the left pleural sulcus showed small amount of fluid present. Both lung fields showed a diffuse parenchymatous infiltration throughout. This was heaviest in the mid-lung zone bilaterally, where the density approaches consolidation. In these areas there were highlights suggesting beginning excavation. Close examination of the infiltration showed it to be composed of many small, often fairly discrete, nodules.

Serial films taken annually by the Workmen's Compensation Board since 1936, were essentially normal until the film of September 16, 1940, described above.

Laboratory examinations.—The sputum was mucoid, and repeated tests have been negative for tubercle bacilli, spirochætes, and fungi. The fasting gastric contents showed the presence of pus, suggesting swallowed sputum, but no tubercle bacilli were found. Cultures were made from sputum and gastric washings. The sputum was carefully obtained after first washing the mouth with a mild antiseptic solution.

Sedimentation rate 2 mm. in one hour; 6 mm. in two hours (Westergren). Kahn and Hinton tests negative. Blood agglutination and culture tests were negative. Urine negative. Red blood cells 5,400,000; white blood cells 7,500; Hgb. 94% (Sahli). Polymorphonuclear leucocytes, 73%; lymphocytes, 20%; monocytes, 5%; eosinophiles, 2%.

Repeated tuberculin skin tests (human type) have been entirely negative even when the dosage was raised to 1 mgm. of old tuberculin. There has been no elevation of temperature throughout his condition.

Diagnosis.—Tentatively put as fungus invading the pulmonary apparatus. The patient was given iodides, but there was no apparent change in pathosis.

November 14, 1940. Report of Toronto Laboratory, Provincial Health Department of Ontario.—A yeast-like fungus was isolated from the sputum cultures which fermented glucose, lævulose, arabinose, and maltose (slight). On milk acid was produced, and the milk coagulated. Gelatin was not liquefied. According to its biological characteristics, this organism is *Castellania nabarroi* (*Monilia nabarroi*). A second report from the same source on December 27, 1940, was identical with this one.

As the diagnosis of bronchomoniliasis was now apparent, and therapeutic efforts had failed, it was decided to treat the monilia as a tropical immigrant. The iodides were discontinued and the patient was given quinine sulphate gr. V, b.i.d. per os. This treatment was begun on December 28, 1940.

The patient was discharged from the Fort William Sanatorium, December 31st, and sufficient quinine sulphate given to continue treatment for two weeks. He was referred to Dr. J. D. Adamson, of Winnipeg.

The x-ray signs showed an unquestionable improvement, dating from January, 1941, and no further therapeutic measures were instituted. Dr. Adamson kept him under close observation, and remarked on the steady recovery of this patient (Fig. 2), whose present weight (March, 1942), is 200 lbs. There are no physical signs in his chest; he feels very well, and is carrying on in full industrial employment.

From this, it is evident that quinine sulphate may be of some value in eradicating monilia from the human pulmonary system.

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Fungi sometimes invade the lungs. Pneumonomycosis in this country is reported only rarely, but is difficult to recognize, and is, therefore, often overlooked. The types of fungi which have most often been found in the lungs are members of the groups of blastomycetes, actinomycetes, penicillium, monilia, aspergillus, mucor, torula, and coccidioides.[1] Monilia, more accurately termed *Monilia persoon,* are yeast-like

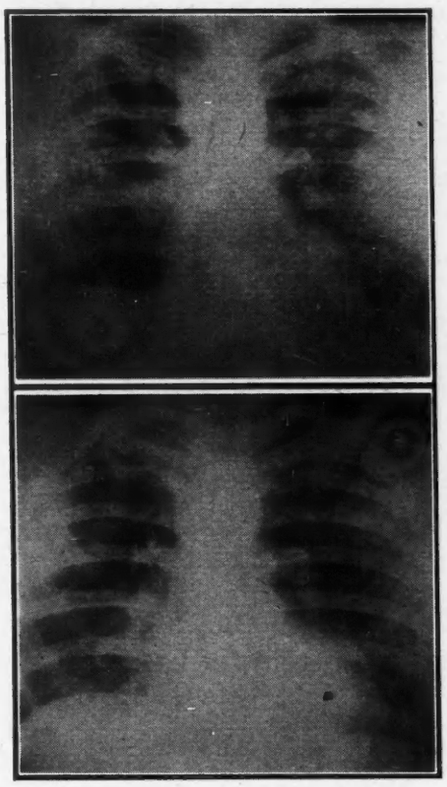

Fig. 1.—Plate taken September 16, 1940, showing fungus staining lung picture (this type of picture is sometimes referred to as the "frozen lung").

Fig. 2.—Plate taken October 28, 1941. There is here no evidence of mycotic lung infestation; considerable fibrosis is present, of fine net-work pattern.

fungi found in decaying wood and leaves, especially in the dust of crushed tea leaves and of grain. Monilia act physiologically like true yeast, since they ferment sugars and produce gas. Morphologically, they differ from true yeasts (Saccharomyces) in that they have a vegetative body (mycelium) which consists of a collection of fine filaments of threads (hyphæ) and reproduce by free-borne spores (conidia).[2] The genus Monilia belongs to the class of fungi imperfecti (Hyphomycetes).[3] Species subdivision is attempted on the basis of biochemical reactions in fermenting sugars. The monilia body is ovoid in shape with buds, Gram-negative with deeply staining ends,[4] and is cultured on Sabouraud's medium, using maltose for differentiation.[2] Hunter[5] states that the tubercle bacillus belongs to the streptotricheæ or higher bacteria, and should be classified with the hyphomycetes, the group to which monilia belongs.

Castellani isolated many varieties of monilia and described the disease entity known as bronchomoniliasis. Bronchomoniliasis is a bronchopulmonary disease caused by the fungus of the genus Monilia. From Ceylon, in 1905, Castellani published the first description of this infection.

The diagnosis of fungus infection of the lungs is difficult; mycotic disease of the lung has no distinctive clinical picture, but may resemble several well recognized pulmonary diseases, and can only be diagnosed after careful study. Most of the fungi found in the sputum, however, are secondary invaders and their presence in the sputum is not conclusive evidence that they are responsible for the symptoms produced.[6, 7] A fungus infection should always be suspected when there is pulmonary disease that does not readily and easily fit into one of the accepted diagnostic categories, and suspicion should stimulate the effort to demonstrate the presence of fungi in the secretions; the pathogenicity of the parasite can be proved by animal inoculation.

This disease in most instances is mistaken for tuberculosis, and can be distinguished from it only with difficulty. This difficulty is increased by the fact that the two diseases are often combined. Points that are sometimes helpful in differentiation are: (1) The constitutional symptoms characteristic of tuberculosis may not be so severe in fungus infections. (2) In fungus infections the progress of the disease is sometimes extremely slow and is marked by the development of extraordinary fibrosis. (3) Tuberculous lesions in adults nearly always involve one or both upper lobes. Pulmonary disease involving only the lower part of the lungs is seldom tuberculous, and, if proved so, some complicating factor is usually present.

Balog and Grossi[8] ascribed the dyspnœa and cyanosis in some mycotic cases to the accompanying myocarditis and decompensation of the right heart which they attribute to the toxins in monilia. Since fungi frequently cause lesions near the hilum or in the lower lobes, and the apices are seldom involved, the location of the disease is sometimes an important help in diagnosis.

Boeck's sarcoid was considered in this case,

but as the patient had no involvement of skin, lymph nodes, bones, uveoparotid tract, nor apparently of any tissue outside the lungs, the diagnosis was discarded.[9, 10]

The intracutaneous test with heat-killed monilia suspension, to determine the allergic response, is not always satisfactory due to the fact that the reacting substance appears to be thermolabile.[10]

In the treatment of pneumonomycoses in general, many agents have been used. Iodides, deep x-ray therapy, bed-rest are the main items, to which quinine sulphate is now added. The presence of concomitant pulmonary tuberculosis contraindicates the use of iodides.

SUMMARY

1. Pneumonomycosis should be suspected in any patient with pulmonary symptoms.

2. A case of symptomless pulmonary disease discovered by x-ray in a young gold miner is presented. Following study the case was considered pulmonary moniliasis. The condition is evidently not alveolar, but interstitial in distribution. In support of the diagnosis of pulmonary moniliasis are the low-grade infection without clinical symptoms or progression, the repeated presence of *Monilia nabarroi* in sputum, and the absence of any other pathogenic organism. These criteria are based on those outlined by Castellani,[11] Rae,[10] Koerth *et al.*,[12] by the Flinns,[3] and by Ideka.[13]

3. Quinine sulphate is suggested for treatment.

I wish to thank Dr. D. J. Galbraith, Vice-chairman, Ontario Workmen's Compensation Board, for permission to quote this case; Professor J. D. Adamson, Department of Medicine, University of Manitoba, Winnipeg; and Dr. D. C. Marlatt, Medical Superintendent, Fort William Sanatorium, Fort William, Ont., for valuable assistance in the preparation of this paper.

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NOTE ON ROSE HIPS AND EVERGREENS AS SOURCES OF VITAMIN C

BY G. HUNTER AND J. TUBA

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WE would refer those unfamiliar with the place of scurvy in this country to the first chapter of Heagerty's[1] "Four Centuries of Medical History in Canada". From the landing of Cartier in 1534 until quite recent times there are records of recurrent attacks of the disease during the winter months when supplies of fresh meats and vegetables have not been obtained.

Even with our present knowledge of the physiological cause of scurvy, and the availability of synthetic vitamin C, the threat of scurvy or milder forms of vitamin C deficiency is not removed from great masses of the population. In the Canadian dietary surveys of 1939 there was found a marked vitamin C inadequacy (see Hunter and Pett[2]).

Our winter supplies of vitamin C are at present largely dependent on imported citrus fruits. An unpublished study by Pett and Waagen* from this Department showed that only in the five summer months, June to October, did the diets of our students in residence reach standard requirements without an appreciable supplement of citrus fruits. This raises a point of some importance with regard to government policy and the possible cutting off of citrus fruit imports. Under such circumstances, and with the expanding use of vitamin C therapy, it appeared to us of some importance to examine other possible Canadian sources of the vitamin.

ROSE HIPS

For some years past there have been various reports of Russian workers finding large

* Now published: Waagen, H. K. and Pett, L. B.: The adequacy of vitamin C in Alberta diets, *Canad. J. of Research*, 1942, **20**: 246.

amounts of vitamin C in rose hips. There is a Russian patent (1936) for the preparation of a concentrate from this source (Rosenberg[3]). Bukin and Zubkova[4] found that the ripe hips of *Rosa acicularis,* a variety common in the Edmonton area, contained 3,186 to 6,904 mgm. % vitamin C on the basis of dry flesh. Their highest value was 4.75% in the raw flesh, or 14.6% in the dry material. They further observed that the higher the latitude at which the roses grew, the greater was the amount of vitamin in the hips. In Britain, in the last two years, considerable attention has been given to the subject, and in a recent issue of *The Listener* it is stated that 2,000 tons of hips are expected to be processed this year. Pyke and Melville[5] found more vitamin C in hips from North England and Scotland (range 200 to 1,870; average about 900 mgm. %, raw flesh) than in those from South England and Wales (range 10 to 760, average about 300 mgm. %, raw flesh). The values for Britain are thus appreciably lower than those found in the U.S.S.R.

Our investigation was started towards the end of August, by which time many of the *R. acicularis* hips were already ripe. Two other varieties common here, *R. woodsii* and *R. arkansana,* or prairie rose, ripen later.

Hips have been collected around Edmonton, and through the kindness of various people, received from different localities in the Western Provinces and from a few northern points. We give here only our summary findings to date. The work will be reported in more detail elsewhere.

It may be observed that a ripe rose hip, with stalk and flower residues removed, weighs about 1.0 grm. Of this about 2/3 is flesh and about 1/3 seeds and hairs. The seeds contain a negligible amount of vitamin C (about 20 mgm. %). The flesh commonly contains about 2/3 water, but this is a widely variable factor.

The average of 6 samples of 3 varieties picked on October 6th were:

R. acicularis—6,282 mgm. %, dry flesh.
R. woodsii—4,867 mgm. %, dry flesh.
R. Arkansana—5,618 mgm. %, dry flesh.

From 119 estimations on 43 lots of hips the range was 882 to 3,676, average 1,637 mgm. %, raw flesh; or, on a dry basis, range, 2.65 to 11.03 (average 4.91%).

It will thus be seen that an average rose hip contains about 10 mgm. vitamin C and that three hips have as much vitamin as a good orange.

The flesh of the rose hip has a bland taste, as most people who have nibbled them in youth, know. The fine hairs associated with the seeds are unpleasant in the mouth, probably irritant to the gastric mucosa, and, perhaps for these reasons, the rose hip has not been used for preserves in this country as many wild berries are. When the hairs are dried, they resemble cowitch in appearance and in their irritating action on the skin. Thus, for the utilization of vitamin C in rose hips it is desirable that the hairs and seeds be removed.

As vitamin C is water-soluble rich aqueous extracts are readily obtainable. Thus if the whole hips are just covered with water, boiled for about 15 minutes, the fruits broken to a pulp, and this expressed and filtered through Canton flannel, a clear pale yellow juice is obtained containing about 0.5% vitamin C; that is about 20 mgm. per teaspoonful. On account of the bulk of the seeds the yield by this method is only about 40 to 50% of the vitamin in the hips used. Such extracts can be used directly or made into preserves of various kinds.

There is no appreciable destruction of the vitamin by boiling for periods up to 30 minutes, and no loss was noted after two months in several preserves.

The seeds may also be removed by hand, but this is tedious. The flesh thus obtained can be dried best at a temperature of 60 to 70° C., but with destruction of 20 to 25% of the vitamin. By this process, however, we have prepared dry powders containing as much as 5.4% of the vitamin. One gram of such a powder nearly meets the adult daily requirement of vitamin C. By vacuum dehydration a powder could no doubt be obtained without loss of vitamin.

From an estimate kindly furnished at our request by Prof. E. H. Moss, of the Department of Botany, the wild rose hip crop of Alberta is of the order of half a million tons. This would supply about 5,000 tons of vitamin C. The yearly demand for one million people, with the generous allowance of 100 mgm./day, would be about 36 tons.

EVERGREENS

It is apparent that a decoction of the bark and leaves of a spruce or hemlock tree cured

Cartier's men of scurvy. Little or no attention has been given on this continent to evergreens as a possible source of vitamin C. Our observations are confined to a number of shrubs and trees, samples of which were kindly supplied us by Prof. J. S. Shoemaker, Department of Horticulture. The leaves or needles were picked on November 3rd. The values given below are mgm. of vitamin C per 100 grm. of fresh material.

Common white spruce	174	Mugho pine	164
Koster blue spruce	193	White cedar	167
Balsam fir	217	*Juniperus communis*	103
Douglas fir	317	*Juniperus scopularum*	202
Jack pine	242	*Juniperus horizontalis*	195

The vitamin C content of evergreen leaves is about one-tenth of that of rose hip flesh, but yet three to five times more than orange juice (about 50 mgm./100 ml.).

It may be emphasized that those two great sources of vitamin C, rose hips and evergreen leaves, are winter sources.

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RÉSUMÉ

Les fruits de la rose et les feuilles ou aiguilles de certains arbres ou arbustes toujours verts (conifères) sont une source de vitamine C qui peut aider le pays à compléter sa ration pendant les mois d'hiver. Un fruit de rose donne en moyenne, à l'état sec, 10 mgm. de vitamine C et 3 fruits donnent environ la valeur d'une orange. Les aiguilles de conifères donnent en vitamine C le dixième de ce que donne la fleur de la rose, mais elles en donnent 5 fois plus que le jus d'une orange.

JEAN SAUCIER

THE USE OF EVAPORATED HALF-SKIMMED MILK IN INFANT FEEDING*

BY CHARLES E. SNELLING, M.B.

Toronto

REDUCTION of the fat content of milk used in the artificial feeding of infants is useful in the correction of certain feeding disturbances, and probably safer as a general rule in making formulæ. Hitherto this has not been possible with evaporated milk, and for some time many of us have felt the desirability of a half cream evaporated milk which would sell at no increase in price. Recently one of the companies making evaporated milk has started to produce an evaporated partially skimmed milk† which when diluted with an equal amount of water makes a 2% fat-content milk.

In two nurseries for the newborn at the Toronto Western Hospital, observations were made comparing regular evaporated milk and this partially skimmed evaporated milk. For a period of one month the complementary feedings used in one of these nurseries was the standard feeding which has been in use for some years, *viz.*, evaporated milk, water and dextrimaltose. In the other nursery feedings with approximately the same caloric content, but made of the partially skimmed evaporated milk, were used. After one month the types of feeding for the two nurseries were reversed and a second month of observation carried out. The composition of the supplementary feedings is seen in Table I.

As a result of this, 73 cases were collected during this period which had been supple-

TABLE I.

COMPOSITION OF FEEDINGS

	Evaporated milk ozs.	*Water* ozs.	*Dextrimaltose* oz.	*Part skimmed evaporated milk* ozs.	*Water* ozs.	*Dextrimaltose* oz.
1st day	1	19	½	2	19	½
2nd day	3	17	½	4	17	½
3rd day	3½	16½	½	4½	17	½
4th day	4	16	½	5½	14½	½
5th day	4½	15½	½	6	14	½
6th day	5	15	½	7	13	½
7th day	5	15	1	7	13	1
8th day	5	15	1	8½	17	1

* From the Department of Pædiatrics, University of Toronto, and the Hospital for Sick Children, under the direction of Alan Brown, M.D., F.R.C.P.(Lond.), and the department of Obstetrics and Gynæcology, Toronto Western Hospital under the direction of R. W. Wesley, M.B., F.R.C.S.(C).

Read at the annual meeting of the Canadian Society for the Study of Diseases of Children, Belleville, Ont., June 6, 1942.

† This material was kindly supplied by the Cow & Gate Company and goes under the trade-name of "Farmer's Wife Brand" partially skimmed evaporated milk.

mented with the skimmed evaporated milk, and 58 using the regular feeding. The results are tabulated in Table II.

TABLE II.

	Regular feeding (58 cases)	*Special feeding (73 cases)*
Average total loss, oz...	6.37	6.08
Average gain per day, oz.	0.62	0.92
Weight at 10 days:		
Percentage above birth weight.....	44.5	60.0
Percentage at birth weight.....	11.0	4.0
Percentage below birth weight.....	44.5	36.0
Percentage developing feeding disturbance which required change of feeding.....	19.0	12.0

The average loss was greater for the regular feeding. The average gain per day is worked out by dividing the number of days in hospital into the difference between the lowest weight and the weight on discharge. The babies on the partially skimmed milk gained better, averaging 0.92 oz. per day as compared with 0.62 oz. On discharge, 60% on the special feeding, as compared to 44.5% on the regular feeding, were above the birth weight, and 64% were at birth weight or above, as compared to 55.5%.

The number that required any change in feeding, such as protein milk, for a few days, was 12% on the skimmed milk formulæ as compared to 19% with the regular. There were no infants which developed any severe dietary disturbance in either group.

Case reports on four babies, not included in the above series, who were fed the regular evaporated milk formula and changed to the skimmed evaporated milk with benefit, are given.

CASE 1

Baby P., birth weight 8 lb. 10 oz., lost or failed to gain weight for 13 days, down to 8 lb., and was vomiting all or part of feeding. Was put on skimmed evaporated milk with improvement of symptoms, weighing 9 lb. 6 oz. at 4 wks. of age.

CASE 2

Baby F., birth weight 8 lb. 3 oz., had loose stools; weighing 7 lb. 15 oz. on 10th day, was changed to skim milk and began to gain. Stools improved and has done well since. This feeding is still being used at 8 mos. of age.

CASE 3

Baby McG., birth weight 8 lb., lost weight with some regurgitation up to 10th day, weighing 7 lb. 4 oz. Was then put on skimmed evaporated milk and gained daily.

CASE 4

Baby R., birth weight 6 lb. 4 oz., had loose stools and lost or failed to gain weight for 9 days; weighed 5 lb. After change to skimmed evaporated milk, gained and weighed 6 lb. 1 oz. by 14th day.

This type of feeding was used successfully in a case of eczema in which the rash had improved, using the regular evaporated milk cooked for a prolonged period, but regurgitation of food was present.

From the data one can conclude, then, that the reduction in the fat content was a definite advantage to the nutrition of these infants.

Further observations have been made in individual cases in private practice. Many babies who were regurgitating ordinary evaporated milk modifications were placed on this skimmed evaporated milk with definite improvement of symptoms. Also with some babies on regular evaporated milk, the appetite fails and the child starts refusing. Changing to the partially skimmed milk corrects this.

In conclusion, this partially skimmed evaporated milk makes available another implement to be used in the feeding of babies. It is now on the commercial market.

RÉSUMÉ

Le lait évaporé à demi écrémé est mieux supporté et permet un développement pondéral plus rapide du nourrisson que le lait évaporé standard. Ce lait dilué dans de l'eau à parties égales donne 2% de matières grasses. La quantité par biberon est sensiblement plus élevée que pour le lait évaporé standard: de 1 pour 2 à 5 pour 8½. Ce lait est maintenant sur le marché. JEAN SAUCIER

MALARIAL PARASITES PRESERVED BY QUICK FREEZING.—Malarial parasites can be frozen at temperatures colder than 100 degrees below zero in the Fahrenheit scale and kept at that extremely frigid temperature for as long as seven weeks without damage, Dr. Reginald D. Manwell, of Syracuse University, announced recently. His method, so far applied only to the parasites of bird malaria, consists of instantaneously freezing them in a small amount of birds' blood in a test-tube by whirling the tube at high speed in a mixture of alcohol and dry ice. Thawing within a few seconds is required to avoid killing the parasites. Saving of urgently needed shipping space and reduction in expense will be one result of Dr. Manwell's achievement, since the parasites can now be shipped frozen in small containers from one laboratory to another, instead of in the bodies of guinea-pigs, birds, or other laboratory animals.—*The Diplomate*, November, 1942.

A METHOD OF TREATING PSORIASIS*

BY PAUL A. O'LEARY, M.D.

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IN 1925 Goeckerman[3] described a method for treating psoriasis that has continued to be in my experience the most satisfactory way of ridding a patient of an attack of the disease. The cause of psoriasis is not known, and as there is accordingly no specific treatment for it, the therapeutic suggestions that have accumulated over the years are legion. There is no need to discuss these various programs because each one is a development of an impression gained in one way or another by the originator of the system. There are two remedies which tend to minimize or at least keep in abeyance the attacks of the disease but in so doing frequently produce sequelæ that are more serious than the psoriasis. I refer to x-ray therapy and the use of Fowler's solution (solution of potassium arsenite). Because Fowler's solution does minimize the number of plaques of psoriasis, patients frequently continue its use to the point of producing arsenical keratoses and pigmentation. The former are serious because of their tendency to become malignant. Roentgen therapy likewise melts the plaque with less inconvenience to the patient than any other method of treatment, but as the number of previous treatments is forgotten frequently and psoriatic patients change physicians often, ill effects in the skin from the x-rays which lead to cancerous changes have become too common. However, the judicious use of the x-ray by those trained in its application is not to be condemned, as it probably is the most commonly used treatment for psoriasis.

Although the method of treatment suggested by Goeckerman is successful in getting rid of an attack of psoriasis, it is inconvenient in that it requires hospitalization. Because of this fact it is used most commonly in treatment of patients who have an extensive crop of the disease and is hardly worth the effort in dealing with the patient who has only a few lesions on the elbows or knees. In our experience approximately 12% of psoriatic patients have arthritis of one type or another, either chronic infections, senescent or psoriatic arthritis. In this latter group the treatment about to be detailed has been successful, not only in causing disappearance of the cutaneous lesions but also in relieving the pain in the joints.

The two types of psoriasis in which the method is the least efficient are (1) the nummular form of the disease of recent origin and (2) generalized exfoliative psoriasis. Both of these manifestations of the disease are somewhat resistant to this treatment, requiring more time in the hospital and being attended with less success in getting rid of the lesions.

The treatment consists of the use of coal tar ointment* (2 to 4%), ultraviolet light, oatmeal baths, and autohæmotherapy. There are a few additional procedures used in special cases that will be discussed later. On the first day in the hospital all the patches of psoriasis are covered thickly with the ointment, which is left on overnight. The following morning it is removed with a light weight mineral oil, but care should be taken to leave a thin film of the oil on the skin. The reason for this is not known but experience has shown that it is essential, paradoxical as it may seem, in view of the fact that ultraviolet light therapy is given to the skin through the film of oil. At the first treatment the light is applied for one minute at 30 inches' (76 cm.) distance after dividing the skin surface into six areas. The time of exposure is increased and the distance decreased each day in order to maintain the skin in a state of mild erythema. It is advisable to keep the reaction from the ultraviolet light below the point of blistering, although in certain cases this is difficult to do when one is endeavouring to produce erythema in a large, indurated plaque. Occasionally, satisfactory erythema is difficult to obtain if the lamp has been used for a long time and is almost burned out, or if the patient has a tan from long-continued use of ultraviolet or sunlight.

After the light treatment the patient spends

* Read before the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alberta, June, 1942.

* Ointment: Crude coal tar, 1.20 or 2.40; pulv. zinc oxide, 1.20; cornstarch, 30.00; petrolatum, 60.00.

half an hour to two hours in an oatmeal bath* or an ordinary tub of water kept at approximately 95° F. This loosens the scales and allows the patient to remove them by brisk rubbing of the skin while in the tub. After the bath a thick coating of the ointment is applied again to the skin, the endeavour being made to put it mainly on the patches. It is usually advisable to apply a second coating of the salve over the first one before retiring for the night. An inexpensive cotton suit of underwear (union suit) or a gauze covering is worn to protect the bed clothing.

Autohæmotherapy is given at two-day intervals for five doses. The technique consists of drawing 10 c.c. of blood from the cubital vein and injecting immediately into the buttocks by dividing it so that 5 c.c. is given on each side.

This combined procedure is continued daily until no psoriatic scales remain and there is little if any induration left in the plaques. The period of hospitalization for extensive psoriasis under this regimen approximates two weeks. If the induration of the lesions is marked an additional week may be necessary.

The tar ointment is not pleasant to use on the scalp if psoriasis is present; therefore an ointment of 5% salicylic acid in 5% unguentum hydrargyri ammoniati is rubbed into the scalp vigorously each day, followed by a shampoo the next morning. This is continued until the scalp is rid of the thick flaky patches of psoriasis. The use of ointment is of no value in the treatment of psoriasis of the nails.

Approximately 12% of the patients suffering from psoriasis that I see have arthritis. In all of these patients the psoriasis is not the cause of the arthritis, as infectious and senescent types are encountered in addition to the form which I believe is due to the same etiological factor or is a part of the skin disease. Hench[4] has called attention to the fact that psoriatic arthritis is characterized by involvement of the terminal phalanges as the first sign of the joint disease and by a moderate degree of parallelism in exacerbations of the cutaneous psoriasis and the arthritis. In most of these patients the cutaneous lesions have been present for many years and involvement of the finger nails in the form of pitting and separation of the sides of the nail from its bed is noted commonly. Although it is not a constant finding, it is fairly common to have patients comment on the fact that the arthritis improves when the psoriasis involutes either from treatment or spontaneously with the change of the seasons. I am familiar with the fact that not all physicians agree that there is a causative relation between these two diseases, and I cannot submit laboratory evidence to prove this relation to them. Nevertheless, the frequency with which the pain disappears from the joints of these patients as the cutaneous lesions fade out under the Goeckerman regimen, only to recur with the return of the skin lesions, is too common in my experience to pass unnoticed.

In treating the patients suffering from psoriatic arthropathy in whom the involution of the joint symptoms lags behind the cutaneous improvement it is my practice to use foreign protein therapy in the form of intravenous injections of typhoid vaccine, together with baking and massage of the joints. Unfortunately, treatment does not prevent recurrences of the psoriasis nor the arthritis, so that it is not possible in some instances to halt the development of severe and crippling arthritis deformans.

Vitamin D at one time seemed to offer promise in the treatment of psoriasis. After several years' experience[1, 2] it was observed, however, that only a few patients were helped by it and they were those in whom the psoriasis was of recent origin and of the nummular type. I cannot see any objection to its use in conjunction with the tar ointment program in treatment of persons suffering from this form of the disease, especially when there is a tendency for the cutaneous lesions to involute spontaneously in the spring of the year, or in treating patients whose diet has been deficient for one reason or another.

The complications from the Goeckerman treatment are negligible, as no systemic manifestations of any type have been encountered. The occasional blistering, from the ultraviolet therapy, of the normal skin surrounding a psoriatic plaque is the most severe sequela encountered and is of only slight inconvenience.

In approximately 15% of the 2,000 cases in which I have used this treatment the disease has

* Boil 2 cupfuls (480 c.c.) of bulk oatmeal in 1 quart (1 litre) of water for thirty or forty-five minutes in a double boiler. Allow to cool for fifteen minutes and then add 120 c.c. of baking soda. Pour the entire mixture into a gauze bag and tie shut. Place in a bathtub a half to three-fourths full of water at 95° F. The patient may stay in the tub for half an hour to two hours, expressing the oatmeal mash through the gauze and applying it to the body. Wash the mash off thoroughly before leaving the tub. Dry by patting, not by rubbing.

not returned, while in approximately a similar group the plaques recur in two or three months after its completion. The remaining patients' remissions vary from several months to many years. The length of the remission is influenced by the persistence of the patient in carrying out some of the program at home at the first signs of recurrence. Although I wish to emphasize the point that I do not infer that this program of treatment is a cure for psoriasis it is, nevertheless, a procedure which psoriatic patients can resort to as often as is necessary in ridding them of their cutaneous involvement.

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OBSCURE PAINS IN THE CHEST, BACK OR LIMBS*

BY F. GERARD ALLISON, B.A., M.D., M.R.C.P. (LOND.)

Winnipeg

THE object of this paper is to describe some obscure pains commonly encountered in practice, which are either omitted from textbooks, partially described under a meaningless term like intercostal neuralgia, or described only in advanced forms.

INTERCOSTAL CRAMP

Intercostal cramp probably affects most persons at some time. The writer has had it off and on since childhood. The public is familiar with the form called "a stitch in the side", coming on while running, but when a sudden cramp near the left nipple attacks a person at rest, it is commonly mistaken for a heart condition. So sharp and deep-seated is the pain that it feels as if the heart has been hooked on a rusty nail. The patient must remain immobile, breathing shallowly, as deep breaths are painful, until in a minute or two the muscle spasm relaxes and the ability to take a deep breath proclaims the end of the attack. A similar pain on the right side arouses little apprehension except in those aware of a dextrocardia. Explanation and reassurance is usually sufficient by way of treatment. If attacks are frequent a carminative might help, by altering the pressure relationships within the body cavity. Capps[1] advances the theory that a thoracic or abdominal stitch coming on during violent exercise is due to unilateral anoxæmia of diaphragmatic muscle, but spasm of an intercostal muscle will serve equally well to explain the type of pain described above.

LEFT INFRA-MAMMARY ACHE

Left infra-mammary ache, first adequately described by Doris Baker,[2] is encountered almost daily by the physician. Many patients mistakenly imagine it to be cardiac in origin. It is most commonly met with in nervous people, especially women. Frequently it is accompanied by neurotic symptoms such as sighing, breathing, or inability to get a satisfactory breath. Organic heart disease, and the effort syndrome, are often accompanied by this pain, no doubt due to the attention of the patient being centred on the heart. The pathology is obscure. The ache lasting continuously for hours or days at a time, usually over a period of years, at once differentiates this pain from angina pectoris. There is usually associated intercostal hyperæsthesia and tenderness. This would suggest fibrositis, but injections of local anæsthetics are ineffective. The usual treatment is reassurance, bromide and a holiday, with local heat and analgesics only if the pain warrants it. Intercostal cramp and left infra-mammary ache are not infrequently encountered in the same patient.

DIAPHRAGMATIC PLEURISY

Diaphragmatic pleurisy is another relatively common condition which often causes confusion in diagnosis. Capps[3] has shown that inflammation or irritation of the muscular part of the diaphragm is felt over the corresponding side of the lower thorax, abdomen and lumbar region in the distribution of the lower six thoracic nerves, whereas involvement of the central tendon is felt in the top of the corresponding shoulder or side of the neck, particularly along

* Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alta., June 19, 1942.

the trapezius ridge. The latter pain is referred from the phrenic nerve to the 3rd or 4th cervical segments. Both the abdominal and neck pains are usually associated with hyperæsthesia and superficial tenderness. The abdomen may be rigid. The presence of diaphragmatic pleurisy is the cause of the old confusion between pneumonia and appendicitis. If the patient admits that the pain is much worse on breathing, and especially if pain in the shoulder is caused by breathing, the diagnosis is clear.

THE SCALENUS ANTERIOR SYNDROME

The scalenus anterior syndrome, especially in its minor forms unassociated with wasting or anæsthesia, is much commoner than is generally realized. Within a period of two years I found twelve cases. All but three were females, ranging in age from 37 to 60. Symptoms had been present from six months to twelve years. In six the symptoms were bilateral. Only three had colour changes in the hands, and none had any wasting or anæsthesia. Six were x-rayed and in two cervical ribs were found. Only one was severe enough to justify operation. X-ray was negative in this case. After Dr. A. W. S. Hay severed the insertion of the scalenus anterior on each side the ten-year pain and paræsthesia, which had been severe enough to prevent sleep, disappeared permanently. In one case with bilateral cervical ribs operation is pending.

The symptoms, occasional aching pain in the arm and hand, usually accompanied by numbness and sensation as of pins and needles, and sometimes by cyanosis of the hands, occur when there is compression of the brachial plexus, which is sometimes accompanied by compression of the brachial artery. This may be due to a cervical rib, a tendinous extension of a cervical rib, or, more commonly, by the scalenus anterior muscle increasing the angulation of the neurovascular structures passing over the first rib or squeezing them posteriorly against the scalenus medius. The onset of symptoms may be due to sagging of the shoulder girdle following a period of ill health, or to a new strain; *e.g.*, rifle-carrying or water-carrying. For diagrams of the structures concerned the article of Craig and Knepper[4] may be consulted. The pain is particularly apt to occur when the patient lies on the shoulder of the affected arm in bed. If the condition is suspected, it is very easy to confirm the diagnosis by exerting heavy downward pressure on the patient's shoulders. This will cause the characteristic pain, numbness, and "pins and needles". The symptoms can be relieved at once by passive elevation of the shoulder. Mild cases may be treated by instructing the sufferers to avoid positions or exertions which cause the pain, and to elevate the shoulder, if necessary with a sling, when the pain occurs. Reichert[5] recommends a triangular arrangement of three pillows for preventing nocturnal pain. Exercise to restore the tone of the shoulder girdle may be curative. Severe cases can be cured by the comparatively minor operation of severing the attachment of the scalenus anterior to the first rib. If a cervical rib is present, its distal portion can be removed by a rongeur. The skin incision should be vertical, to avoid the cutaneous branches of the third and fourth cervical nerves.

OCCIPITAL FIBROSITIS

The great success attending the injection of tender fibrositic spots in the back with 10 c.c. of 1% novocaine is well known, but that similar permanent relief usually follows injection into the tender occipital insertions of the nuchal muscles is probably not as widely realized. Aside from hypertension, occipital fibrositis is the commonest cause of posterior headache. In one case this headache was felt not only in the occiput but also in the right temporal region. Both pains were relieved by occipital injection.

SUDDEN LUMBER PAIN WHILE STOOPING

A patient seized by a severe lumbar pain while picking up an object from the floor, and unable to straighten up, may be quickly relieved of his pain by the method described by Troedsson.[6] The patient lies on the back; the operator grasps the ankle of a flexed leg and gives it a sudden powerful tug at the same time as the patient kicks. This can be repeated several times with each leg. The most plausible theory is that the sudden motion of the spine enables the escape of a pinched portion of a synovial membrane caught in one of the inferior articular facets of the 5th lumbar vertebra. When the manipulation is successful the pain leaves and the patient is able to flex and extend the spine. My own few observations agree with those of the original author.

CHRONIC VAGUE MUSCULAR AND JOINT PAINS

Chronic vague muscular and joint pains in adults, with no localizing signs, should arouse suspicion of hypothyroidism or of undulant

fever. In the first case sensitivity to cold and a dry skin, and in the second evening temperature, sweats, and skin and agglutination tests would help to establish the diagnosis.

Nocturnal Leg Cramps

Nocturnal leg cramps, while occasionally associated with gout or with the tetany of advanced nephritis, are usually of unknown origin. If they occur frequently in debilitated patients the loss of sleep may be serious. Moss and Herrmann[7] found that the cramps were prevented in 15 elderly patients by 3 grains of quinine night and morning. One of my cases required as much as 10 grains nightly to prevent the cramps to which he had been a martyr for years. As quinine is quickly eliminated, nocturnal administration only would seem to be more rational.

Growing Pains

Shapiro,[8] in an important communication which aroused too little comment, claimed that there is a clinical difference between harmless growing pains and subacute rheumatic infection. When a history is taken carefully in childhood the true facts can usually be elicited, but when details of childhood pains are sought from an adult with rheumatic heart disease the differentiation is impossible owing to the remoteness of the events. Of his series of 100 cardiac children only 16 gave no history of rheumatic fever or chorea. Of the 16, ten gave a history of subacute pain and stiffness in the joints. Subacute rheumatic infection causes pain, and stiffness in any joint, especially on getting up in the morning, may cause limping, may have local signs, and may also cause changes in the hæmoglobin, sedimentation rate, and pulse rate. By contrast innocent growing pains, *i.e.*, pains in the muscle of the legs which wake the child at night, cause no local or general signs and no inconvenience in daytime. The causation of innocent so-called growing pains is unknown.

Hawksley,[9] in an independent article published in England at the same time as that of Shapiro in America, reached identical conclusions. He reported that of 253 children with growing pains followed for 4 years only two developed rheumatic heart disease. This is the same incidence as that of the general child population. Growing pains were more apt to cause crying than rheumatic pains. Children with growing pains often had postural or orthopædic defects such as flat feet, knock-knees, scoliosis or a bad stance.

Leg "Jitters"

This is a common minor ailment which I have never seen described. It occurs most often when the legs get warm in bed, and prevents going to sleep. It has no relation to the sudden leg-jerk which sometimes occurs at the moment of going to sleep. A curious unlocalized restlessness is felt in one or both legs. It is not quite a pain, but is distinctly unpleasant. There is no skin irritation. A combination of voluntary movement and involuntary jerks of the affected limb fails to find rest. Massage has no effect, but getting up and walking about may give relief. In ten minutes to an hour the "jitters" depart, and sleep comes. I have observed this condition mainly in myself, relatives, and friends, as patients do not often complain of it unless it occurs frequently enough to cause loss of sleep. The disagreeable sensation stops at once on chewing 1/100 grain of nitroglycerine, suggesting that the cause is vascular.

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A new use for toothpaste is mentioned by Dr. H. S. Buckland in a letter to *The Lancet* in which he mentions that if gas attacks come we may have difficulty in maintaining clear vision through the windows of our masks. A little toothpaste, he states, will make as efficient an anti-dimming preparation as it is possible to get. A little of the paste should be smeared on and then polished off. Dr. Buckland adds that this measure works equally well with motor-car windscreens and laryngeal mirrors.—*J. Roy. Inst. Pub. Health & Hyg.*, 1941, **4**: 188.

THE EFFECTIVE USE OF VITAMINS

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THE essential rôle of vitamins in the maintenance of health is widely recognized. That physiological inefficiency, dysfunction and disease may follow when dietary supplies are inadequate has been established beyond question. There is considerable evidence to suggest that inadequate nutrition is widespread. Recognizing that a significant portion of this inadequacy may be incidental to losses of essential nutritive factors during the processing and handling of certain staple foods, a program of restoration or "enrichment" of common foods has been encouraged. Furthermore, educational campaigns on fundamental facts of nutrition, conducted on behalf of national health and efficiency in the war effort, are contributing to an elevation of the nutritional status of the population at large.

Contrasting with these well considered basic efforts and exploiting the widened awareness of the importance of vitamins engendered by them, effective advertising campaigns promoting various vitamin products have carried the implication that the problem of nutritional inadequacy can be solved by providing supplements of pills, capsules, and elixirs containing vitamins. By emphasizing the fact that many diets may be inadequate, a fear is subtly implanted that no one can avoid the ills of vitamin starvation unless he purchases health insurance in the form of a preferred combination or complex of vitamins. If this policy were questioned the plan would be defended by the assertion that vitamin pills and elixirs may confer positive benefits on a few and exert no harmful effects on the remainder. As a further gesture in defense of indiscriminate recommendation of special vitamin preparations, attention would be called to price, only a few cents a day, a trifling cost, made possible only by sales on a large scale. These same considerations are advanced with intensified urgency on behalf of the promoters regarding the provision of vitamin supplements without discrimination for all patients, irrespective of their individual dietary supplies.

In view of the fact that provision of essential nutritive factors, including vitamins, over and above certain optimal levels results in excretion or destruction of the excess, universal and uncritical prescription of vitamins should be recognized as physiologically and economically wasteful. Under present conditions, particularly, such extravagant practices should be discouraged in order to conserve these agents for use when and where they can be utilized with benefit. Clinical application of this general principle is sometimes difficult, not because of a lack of data but partly because of the lack of a convenient procedure for approximating the need for and supply of vitamins. Further difficulties arise because dosages of vitamins are expressed in scientifically proper, but none-the-less confusing, variety of terms varying from International units, U.S.P. units, milligrams, and micrograms or gammas. The practical objective of prescribing vitamins neither too little, too late, nor too much, too long, and yet effectively may be reduced to the questions of when, how much, and how long should vitamins be prescribed.

The question as to how often the prescription of accessory supplies of vitamins is indicated can be approached in several ways. The incidence of specific vitamin deficiency disease provides one probable index. The occurrence of primary avitaminosis appears to be low in a representative suburban community, *viz.*, a

TABLE I.

COMPARATIVE INCIDENCE PRIMARY AVITAMINOSES

Hospital		*Period (years)*	*Incidence percentage*
Abington Memorial			
Polyneuritis	1	2 (1940-41)	0.18
Pellagra	1		
Rickets	1		
Scurvy	3		
Total	6		
Total Medical	3332		
Massachusetts General*		3	0.23
Johns Hopkins*		10	0.14
University of Kansas*		3	0.40
Santa Barbara Co.*		3	0.30

*Cited by Clendening, *J. Am. M. Ass.*, 1941, 117: 1035.

population of 75,000 served by Abington Memorial Hospital as shown in Table I.

The relative incidence of cases classified as primary avitaminosis is of the same order of magnitude in widely separated and widely different kinds of communities. The management of acute specific vitamin deficiencies involve but a small portion of medical cases seen in these regions. While all cases of acute nutritional deficiencies occurring in the area may not have been hospitalized, it would appear that only one person per year among 25,000 of the general population developed vitamin deficiency so severely as to require hospitalization.

It is generally conceded, however, that the number of persons presenting classic syndromes of deficiency states does not afford a fully adequate index of the incidence of nutritional insufficiency. There is a widespread belief that dietary supplies of vitamins available to a large section of the national population are inadequate to cover the needs for the person in average health. It is often assumed that this vitamin famine extends uniformly over the entire population. While this assumption would appear to be fallacious, even upon superficial inspection, a lack of conveniently available data on the approximate vitamin contents of average mixed diets available to local groups permits a certain degree of doubt as to the adequacy of any dietary.

In order to secure an index of the relative supply of vitamins afforded by a representative mixed diet and the probable necessity for providing extra dietary supplements of vitamins the following data were tabulated (see Table II).

Values shown for each class of foods represent arithmetical averages of the quantities of vitamins contained in individual servings. These were calculated by recording the content of each serving of specific foods, *viz.*, spinach, carrots, beans, etc., from tables by Eddy.[2] The sum of these divided by the number of days in each period was then regarded as representative of the vitamin content of the class of food described as vegetable. It may be of interest to note in passing that only minor differences were apparent in the average supply of vitamins for the fall and winter periods. Only the mean values for the two periods are recorded here. It may also be observed that the menus offered to various groups in the hospital community vary in only one conspicuous particular, *viz.*, the range of choices of vegetables. At most, such differences would not appear to diminish the total daily A and C supplies by more than 10% of the total and the B and G by more than 3%. It would seem, then, that, at least until further data are available as to precise needs, there is no conspicuous indication for the wholesale indiscriminate prescription of vitamins to those provided with a selection of foods comparable to the aforementioned mixed diets.

These data show that the sum total of the dietary supplies of vitamin A, B, C, and G is ample to cover the daily requirements of the average normal adult. Furthermore, the data indicate more or less quantitatively the distribution of vitamins in various portions of an ordinary mixed diet. This list may be used, therefore, as an index of the adequacy of

TABLE II.

RELATIVE DISTRIBUTION OF VITAMINS IN A REPRESENTATIVE MIXED DIET*

BREAKFAST:	*A* *I.U.*	*B* *I.U.*	*C* *I.U.*	*G* *Micrograms*
Fruit	525	25	600	156
Cereal	0	70	0	45
Eggs or equivalent	336	65	0	256
Beverage (coffee with cream)	150	3	0	25
Total of meal	1,011	163	600	482
DINNER:				
Soup	1,715	43	421	143
Meat	45	170	0	636
Potatoes	30	62	220	50
Vegetable	1,715	43	421	143
Bread and butter	720	11	0	0
Beverage (milk)	253	37	74	518
Dessert	470	25	30	225
Total of meal	4,948	391	1,166	1,715
SUPPER:				
Meat or equivalent	148	117	0	265
Potatoes and vegetables	840	66	184	86
Salad	1,154	30	264	146
Bread and butter	720	11	0	0
Beverage (milk)	253	37	74	518
Dessert	350	16	206	61
Total of meal	3,465	277	728	1,076
TOTAL SUPPLY:				
Breakfast	1,011	163	600	482
Dinner	4,948	391	1,166	1,715
Supper	3,465	277	728	1,076
Daily total	9,424	831	2,494	3,273
Estimated range of Daily requirements				
Minimal	2,000	200	300	1,000
Optimal	6,000	450	1,500	2,500

*Average data calculated from menus presented to nurses of Abington Memorial Hospital for two periods, *viz.*, 2 weeks, September, 1941; 2 weeks, January, 1942, from vitamin table compiled by Eddy.[2]

dietary supplies of vitamins. For example, any normal person having access to a diet of this general composition has a reasonable margin of safety with respect to the supply of vitamins A, B, C, and G. If, however, an individual habitually exercises choices departing widely from average selections and goes without certain meals sub-optimal intakes may arise to the extent of the departure from the reference. When such self-imposed restrictions are pursued it is well to bear in mind that deficiencies of nutritive essentials in addition to vitamin are equally possible.

The daily allowances of vitamins recommended by responsible authorities[3] vary with age, sex, and with physical and physiological activity. It is notable that the requirements for vitamins A and C of the adult do not vary with physical activity, whereas allowances for fractions of the B complex increase with elevation of the caloric turnover. Pregnancy, lactation, and growth involve increased demands for all factors. Except for the first year, the relative requirements for vitamins increase roughly in proportion to the increments in caloric requirements. For most purposes the daily requirements for an average 70 kilogram adult expending 2,500 calories per day might be regarded as basal requirements. These allowances are as follows: 5,000 I.U. of A; 1.5 mg. of B; 75 mg. of C, 2.2 mg. of riboflavin and 15 mg. nicotinic acid. According to the Committee on Foods and Nutrition of the National Research Council a ration containing milk, 1 pint; meat, 1 serving; eggs, 1 whole; vegetable, 2 servings (1 green or yellow); fruit, 2 servings (1 citrus or fresh); butter, 2 servings; bread or cereal (whole grain or enriched); plus additions to cover caloric requirements, can be recommended as a suitable basic diet for an average normal adult. Using the data from the aforementioned list this basal diet contains approximately 3,500 I.U. of A; 450 I.U. of vitamins B; 1,500 I.U. of vitamin C; and 2,000 micrograms of riboflavin. Inasmuch as the extremes of physiological demands do not exceed twice such basal requirements it would be appropriate to employ the basal requirements of a sedentary adult as practical reference levels.

In the light of the foregoing consideration it is possible to formulate an inclusive plan for prescribing vitamins. While the needs are variable, the largest portion of the population can secure sufficient supplies in foods generally available. Smaller numbers of persons require unusually larger amounts of vitamins. In general order of frequency these indications may be considered in three general categories, cases requiring prescriptions for prophylactic purposes, for suspected or probable deficiencies, and, finally, for the correction of specific deficiency syndromes. The relative amounts of vitamins indicated are described in terms of basal equivalents or simple multiples of the amounts required per day by a normal standard adult. These are illustrated in Table III.

TABLE III.

GENERAL PLAN FOR PRESCRIBING VITAMINS

Indications	*Prescription*		
	Kind	*Quantity equivalents*	*Time*
1. Prophylaxis General	Basal diet	Basal	Continuous
Restricted diets	Vitamin-rich foods and/or concentrates	Sufficient to make up deficit from basal	For duration of restriction
Parenteral feedings	Pure vitamins	Basal	For duration
2. Suspected deficiencies (Symptomatic)	Basal diet plus vitamin-rich foods and/or concentrates	2 to 5 times basal	Not over one week unless improved(?)
Probable deficiency (increased losses) (increased demands) (pre-operative) (abn. absorption)	Basal diet plus vitamin-rich foods and/or concentrates or pure vitamins	2 to 5 times basal	For duration
3. Specific deficiency syndrome	Basal diet plus specific concentrates	5 to 10 times basal, occasionally higher	Until cured

It may be observed that specific vitamin supplements are suggested only when a deficient state is clearly evident or likely to develop because of (1) necessary dietary restrictions, (2) decreased absorption or (3) increased tissue demands. In those cases wherein vitamin deficiency is suspected upon the basis of non-pathognomonic symptomatic features alone it is suggested that the results of high vitamin feedings be critically evaluated after a period of one week. Under most conditions clear evidence of improvement appears within this period. Lack of objective betterment with respect to the symptom in question should make a revision of the diagnosis in order. Some exceptions may be observed wherein a state of prolonged deficiency results in an impairment of the capacity for rapid restoration of normal function, thus justifying a longer therapeutic trial. This probability of a delayed response should not, however, lessen a critical and objective attitude toward the results of vitamin therapy.

As suggested earlier, dosages may be expressed in terms of multiples of basal equivalents, *i.e.*, the amount of vitamins needed each day by a standard normal adult. Recognizing that the values now available may be only approximate according to precise standards, simplification of nutritional prescription is made possible by their use. These quantities are defined in Tables IV, V, VI, and VII.

TABLE IV.

DAILY REQUIREMENT OF VITAMIN A FOR NORMAL STANDARD ADULT

BASAL EQUIVALENTS IN SELECTED FOODS

Basal equivalent = 5,000 I.U. = 3.0 mgm. B-carotene.
Dose:—Cod liver oil, 5 grm.
Foods:—Basal equivalents in one average serving.

Kale	7	Brussel Sp.	2	'Greens'	1
Beef Liver	4	Broccoli	2	Prunes	½
Spinach	3	Cauliflower	2	Apricots	½
Squash (yellow)	2	Sweet potato	1	Carrots	½

TABLE V.

DAILY REQUIREMENT OF VITAMIN B FOR NORMAL STANDARD ADULT

BASAL EQUIVALENTS IN SELECTED FOODS

Basal equivalent = 450 I.U. = 1.5 mgm. thiamin.
Dose:—Yeast (brewers') 30 grm. Wheat germ 30 grm.
Foods:—Basal equivalents in one average serving.

Ham	2	Oatmeal	½	Lima Beans	⅓
Pork	2	Hominy	½	Soy Beans	⅓
Peas	⅔	Lamb	½	Veal	⅓
Peanuts (100 grm.)	⅔	Chicken	⅓	Whole wheat bread (3 slices)	⅓
Molasses cane (40 grm.)	⅔				

TABLE VI.

DAILY REQUIREMENT OF VITAMIN C FOR NORMAL STANDARD ADULT

BASAL EQUIVALENTS IN SELECTED FOODS

Basal equivalent = 1,500 I.U. = 75 mgm. ascorbic acid.
Dose:—Lemon juice 80 grm.
Foods:—Basal equivalent in one average serving.

Kale	2⅔	Grapefruit juice (½ C)	⅔
Broccoli	1⅔	Orange juice (½ C)	⅔
Liver	1	Cantaloupe (½)	⅔
Cauliflower	1	Lemon (1)	½
Cabbage	⅔	Lime juice (½ C)	½
'Greens'	⅔	Peppers	⅔
Spinach	⅔	Pineapple juice (½ C)	¼
Brussel sprouts	⅔		

TABLE VII.

DAILY REQUIREMENT OF VITAMIN G FOR NORMAL STANDARD ADULT

BASAL EQUIVALENTS IN SELECTED FOODS

Basal equivalent = 2,000 micrograms = 2.0 mgm. riboflavin.
Dose:—Yeast (brewers') 66 grm.
Foods:—Basal equivalents in one average serving.

Liver	3	Kale	½	Veal	⅓
Kidney	1	Prunes	½	Cheese	⅛
Ham	1	Beans	⅓ to ½	Milk (1 C)	¼
Beef	½	Chicken	⅓	Egg (1)	¼

In order to illustrate the extent to which appropriate selection of foods may be used to provide significant amounts of vitamins the number of basal equivalents present in single servings of a few selected vitamin rich foods are tabulated. The values are calculated from tables presented by Eddy.[2] For most cases the vitamin requirements are satisfied by the one basal equivalent of each vitamin in the basal diet. Furthermore, in many instances effective therapeutic doses could be prescribed in the form of foods. For example, if it were desirable to triple the supply of vitamin A over the basal level, this could be achieved by prescribing the basal diet plus one serving of sweet potato, plus one serving of carrots, plus one serving of apricots. The addition of one serving each of brussels sprouts and spinach to the basal diet would make available six times the basal requirement. Similar application of this method of dietetic prescription to vitamin B, C, and G is equally convenient.

In a few instances it may appear that the cost of prescribing a vitamin in the form of a food is greater than in the form of an elixir or a pill. This difference is more apparent than real, inasmuch as foods contain not only the specific vitamin mentioned in the foregoing tables but also other nutritionally valuable substances. For example, broccoli, which might be pre-

scribed primarily for its vitamin A content, contains in addition substantial amounts of vitamin C. Furthermore, this same food supplies other vitamins, minerals, and carbohydrates. Similar considerations apply to other foods listed.

There is a proper field for the employment of purified vitamin preparations as indicated in Table III. This field is limited as compared with much current practice, and such supplies as are available should be reserved for use where essential, *viz.*, for pregnancy, lactation, infants, for persons requiring parenteral feeding, or for persons required to exist on severely restricted rations and in states of severe deficiency. States of extreme deficiency marked by anorexia can be effectively handled only by the initial administration of purified vitamins.

SUMMARY

Without questioning the existence of widespread nutritional insufficiency and the necessity for appropriate corrective measures attention is directed to the fact that a "vitamin famine" does not extend uniformly over the entire population and that indiscriminate recommendation of vitamin pills, elixirs, and capsules without regard to dietary supplies of vitamins or special individual requirements is unwarranted. In support of this generalization data are presented showing the comparatively low incidence of primary avitaminosis in a fairly typical suburban area, where only 0.18% of medical cases admitted to a community hospital present specific deficiency syndromes. Data showing the approximate vitamin content of foods available to the personnel of a hospital community are cited as representative standards of reference for this distribution of vitamins in average mixed diets. Such a ration shows a fair margin of safety over apparent basal needs.

An inclusive plan for prescribing vitamins has been formulated upon the basis of prophylactic and therapeutic indications. Relative requirements of vitamins for both normal and pathological conditions have been reduced for convenience to a common basis. Daily requirements of a normal standard adult for vitamins A, B, C, and G have been defined in terms of basal equivalents. The relative requirements of various clinical situations have been indicated as simple multiples of these basal equivalents or clinical units. A diet described by the Committee on Foods of the National Research Council is cited, not only as a standard of general reference but as a convenient basis for nutritional prescription. Brief tables showing the number of basal equivalents contained in single servings of a few selected foods are presented to illustrate a method whereby foods can be prescribed to supply not only the amounts required for average health but to a large measure fulfil a large portion of ordinary therapeutic needs.

While the suggested methods only roughly determine the precise demands of individuals, they provide a means whereby relative vitamin needs may be approximated and afford a reasonably sound general practical method for prescribing vitamins effectively.

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RÉSUMÉ

L'avitaminose est relativement rare: 0.18% des cas admis dans un hôpital d'une petite ville de population moyenne. Les repas servis au personnel de cet hôpital démontrent que les besoins fondamentaux en vitamines sont bien observés. Les besoins quotidiens de l'adulte moyen normal en vitamines A, B, C et G sont définis en équivalents fondamentaux, *e.g.*: vitamine G: équivalent fondamental: 1,500 U.I., ou 75 mgm d'acide ascorbique. Des tables indiquant l'équivalent des besoins fondamentaux usuels sont dressées. Ces chiffres aident à prescrire les vitamines à bon escient et à supplémenter un régime alimentaire. JEAN SAUCIER

It has been known for some years that vitamin D is synthesized in the human body as the result of the effect of sunlight upon the ergosterol contained in the skin. It is now suggested that vitamin C can similarly be produced as a result of ultra-violet irradiation. In the *Bulletin of the Cuban Society of Pædiatrics*, Dr. C. Torres Umana describes investigations which have led him to believe that exposure to sunlight produces a synthesis of ascorbic acid by the body which varies with each individual, and that such a synthesis may compensate for an insufficient supply of the food factor in the diet and prevent the onset of scurvy.—*J. Roy. Inst. of Pub. Health & Hyg.*, 1941, 4: 187.

THE PREVENTION OF BULLOUS IMPETIGO IN HOSPITAL NURSERIES*

BY R. P. KINSMAN

Vancouver

SOME months ago Dr. Gruley, addressing a graduating class of medical students, stated that the big problem confronting medical men, especially pædiatricians, today, is the increasing prevalence of infections in the nurseries of maternity wards and maternity hospitals. He said that "this condition is widespread across the continent, and in spite of modern technique has resisted every effort of control".

Many of us who have battled with epidemics of infections in nurseries realize the truth of this statement. After painstaking work and minute attention to detail, using the most careful aseptic technique, cases of gastro-enteritis, upper respiratory infections, and bullous impetigo may appear at any time to frustrate our efforts.

A great number of aseptic techniques have been adopted and later discarded. Many elaborate methods of isolation of the new-born have been worked out, but are too elaborate to be practical in ordinary hospital practice. The problem is still waiting to be solved. There is however, one factor which has possibly been overlooked or, possibly, not given due importance, and that is the hospital laundry. I should like to review briefly our struggles against infection, especially impetigo, in the nurseries of the Grace (Maternity) Hospital, Vancouver, and results which may be helpful.

The nursery technique has always been reasonably good, but for many years there have been constantly recurring cases of impetigo in the nurseries, rarely a month without at least one case and often as many as five or six, and this in a hospital averaging about fifty cases a month. Two other larger hospitals in the city were comparatively free from this disease, and we followed the same technique as these hospitals as closely as possible.

During the latter months of 1939 the situation became much worse, the incidence of impetigo mounting as high as fifteen cases in one month. For the next seven or eight months intensive methods were instituted to clear up this infection.

In the Grace Hospital there are two nurseries, one on each floor, which gave us the opportunity to have a separate nursing staff and a different technique for each nursery. I will give you a brief summary of some of the methods used.

First.—The nurseries were both thoroughly cleaned, the floors scraped and varnished, walls and ceilings repainted, the cots scrubbed and mattresses autoclaved. All toilet articles in the nurseries—*e.g.*, soap, oil, absorbent, etc., were sterilized. All nursery linen was boiled each day and then autoclaved, (and the autoclave was checked).

Second.—The nurses had periodic nose and throat swabs taken, those showing pathogenic organisms being excluded from the nurseries until they showed a negative culture. Nurses were required to wear masks and individual gowns before handling each baby, and to wash their hands after handling each baby. Many different disinfectant lotions and solutions and creams were used for the nurses' hands.

Third.—Visiting doctors were required to wash their hands and put on gowns before entering the nurseries.

Fourth.—Many different techniques were used on the babies themselves. They were bathed and they were not bathed; they were anointed with antiseptic oils, with ammoniated mercury ointment, with antiseptics in glycerine. Babies were handled as little as possible in the case rooms, and taken to the nurseries immediately after birth.

Fifth.—Visitors were allowed to see the babies through the glass windows of the nurseries only, no babies were allowed with the mothers during visiting hours.

Thus the case rooms and nurseries and babies were kept as aseptically clean as was humanly possible, and still cases of impetigo kept recurring. The only possible sources of infection were the mothers or the mothers' beds. It was not logical to assume that the mothers themselves carried the infection, impetigo occurs very rarely when the confinement takes place in

* Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, June 18, 1942.

the home; therefore, attention was focused on the hospital laundry.

Grace Hospital has always had a separate and modern laundry building, and all hospital laundry is done there. The laundress in charge for some years is a very capable and conscientious woman who was trained in the same laundry, and did her work well, but who knew nothing of the modern methods of laundering.

At our request Dr. A. K. Haywood, of the Vancouver General Hospital, very kindly loaned us the services of his laundry superintendent, Mr. Ruddick, who is a widely known authority on laundering, and he made a complete and painstaking investigation of the laundry situation at Grace Hospital. His subsequent report was most interesting. Although the washer and tubs were apparently clean, yet some small parts of exposed metal were covered with verdigris from which smears were made, and found to be swarming with bacteria.

A bacterial count of the rinse water was very high, 17,000 per c.c. We learned that in modern laundries a bleach was always used, not so much to make the clothes white as for its disinfectant properties. Also, to keep the bacterial count of the wash water at a minimum the pH must be kept at 5.5 to 6.5, and to attain this some sour (fluoride or acetic acid or oxalic acid), had to be used to offset the alkalinity of the bleach. The bacterial count of the rinse water must be kept at or below 250 per c.c.

Although a bleach had not been used for years in this laundry the linen was always in good condition and properly white. Now the new methods were at once instituted: a bleach of ½ of 1% hyperchloride solution was used, 2 quarts solution to one hundred pounds of linen, also enough fluoride solution to bring the pH to the required point of between 5.5 to 6.5. Almost immediately the bacterial count of the rinse water fell below 250 per c.c.

Within a month the cases of impetigo in the nurseries fell to zero. In about three months there was a slight rise in infection, and on investigation of the laundry an error in the strength of the bleach was discovered. Again infection fell to zero, and again after a few months a slight rise accompanied by an error in the laundry due to a misunderstanding of the pH, and a corresponding rise of the bacterial count.

Since that time (1½ years), we have daily estimations of the pH and monthly bacterial counts of the rinse water, and there has been only one case of impetigo in the nurseries. We have maintained a careful nursery technique, but no time-consuming and annoying unnecessary methods. The nursery linen is done the same as the ward linen. The babies are bathed once only, when they are discharged, no medicated ointment or oils are used whatever.

It is of interest to note that at the Vancouver General Hospital, where the laundry is also done in a scientific manner, the incidence of impetigo is almost unknown. In another hospital which had much impetigo in the nurseries a change was recently made, and for economic reasons all linen was sent to a good commercial laundry, since then there has been practically no impetigo in that hospital.

I do not mean to infer that the hospital laundry is the only source of infection in nurseries, but I do think it a very important factor, and feel that, especially in smaller hospitals where the washing is done on the premises, a reorganization of the laundry will give most gratifying results.

RÉSUMÉ

Les sources habituelles d'infection ayant toutes été éliminées, on découvrit que la cause de la persistance de l'impétigo à la pouponnière du Grace Hospital de Vancouver était imputable à des imperfections techniques à la buanderie. Le blanchiement du linge à l'hypochlorite, puis la rectification à un pH entre 5.5 et 6.5 par une solution fluorurée amena la fin de l'impétigo.

JEAN SAUCIER

"Fresh air and fresh salads—take all you can of both", should be a helpful maxim according to Sir Wilson Jameson, Chief Medical Officer, Ministry of Health. He urges people to spend as much time as possible in the open air in order that metabolism and bodily efficiency may be increased, and points out that this effect can be achieved without resorting to vigorous exercise. In view of the fact that if we are short of anything, it is of vitamin C, he suggests that it will be of great value if people will form the habit of eating a certain amount of raw vegetable with meals—almost any vegetable can be eaten raw provided it is finely chopped just before the meal.—*J. Roy. Inst. of Pub. Health & Hyg.*, 1942, **5**: 94.

STRANGULATED HERNIA WITH GANGRENOUS BOWEL TREATED BY MULTI-STAGE OPERATION

BY A. W. S. HAY, MAJOR, R.C.A.M.C.

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GANGRENOUS bowel in a hernial sac presents one of the most serious of surgical responsibilities. The gravity of the outlook depends on a number of factors, of which the most important single one is the duration of the strangulation. Fulton[1] records a series of 14 such cases. His results were as follows: 8 patients treated by resection and primary anastomosis—5 deaths; 5 treated by exteriorization only—5 deaths; one treated by replacement only—death from collapse: of 14 patients, 11 died, a mortality of 71%. Watson[2] considers the mortality in these cases to be from 20 to 40%. Frankau (quoted by Cokkinis[3]) records the mortality at from 6 to 30% in all cases of strangulated inguinal hernia.

In a consecutive series of cases seen by me, similar to those reported by Fulton, 6 patients with gangrenous bowel were treated carefully and expertly by the staff of a large teaching hospital. Primary resection was performed in each patient. The mortality in the group was 100%. Recorded mortality and the aforementioned group of cases constituted the background from which the present problem was approached.

In dealing with a strangulated hernia and gangrenous bowel, three pathological entities must be treated. The first is intestinal obstruction with its dehydration, toxæmia and biochemical upset. The second is the gangrenous loop of bowel which, if not removed from the peritoneal cavity, will perforate and give rise to a peritonitis. The third is the hernia itself, which should afford least concern.

The disturbances resulting from bowel obstruction constitute the immediate pressing responsibility of the surgeon. If the gangrenous bowel can be disposed of with reasonable safety in dealing with the obstruction a valuable service has been rendered the patient. If, on the other hand, the attempt to rid the patient of all pathological entities at once risks such a high mortality, surely a multi-stage procedure, by which one entity is dealt with at a time, is worth considering.

The main purpose in recording this case is to emphasize the value of the multi-stage procedure in dealing with gangrenous bowel. Writings on the subject lay much stress on the excoriation of skin, and the wound infection which is said to occur in these cases. Neither of these proved to be a major difficulty in the management of this patient. It is well known that the degree of excoriation from intestinal juices diminishes as the distance of the fistula from the duodeno-jejunal flexure increases. It is also well known that in the great majority of right inguinal herniæ the extruded loop of bowel is low ileum. One would therefore anticipate not much, if any, greater difficulty with excoriation and infection in these cases than occurs in the performance of a total exclusion of the colon as a preliminary to complete excision of the colon. The post-operative course of this patient bears out these contentions.

A second object in this presentation is to record the difficulties arising from shock which occurred whenever attempts were made to divide the mesentery of the exteriorized bowel, and the methods taken to overcome this shock. The third purpose is to re-emphasize the fact that the peritoneal cavity in these cases has a high degree of immunity and may be capable of dealing with obvious contamination in a surprisingly effective manner.

CASE REPORT

A man, aged 63, was admitted to hospital with a diagnosis of strangulated right inguinal hernia, lasting eight hours. Bilateral hernia had been present for years. Several bouts of incarceration had occurred prior to the present episode. From previous attacks recovery had been spontaneous if the patient reclined for a short time. The present onset of pain was left-sided and it was not until a later hour that symptoms occurred in the right abdomen. Preliminary examination elsewhere revealed an easily reducible left inguinal hernia, but excessive abdominal adiposity concealed the small irreducible right inguinal hernia, which became tender and demonstrable after the pains shifted to that side of the abdomen.

On his admission to hospital, the patient was complaining of colicky mid-abdominal pain. He had been nauseated, but had not vomited. He also complained of soreness in the right groin of about two hours' duration. Physical examination revealed a pale, well-nourished but rather dehydrated, elderly man. He was in considerable pain, but his pulse was only 88 and his blood pressure 138/82. The skin was dry and cold; the lungs and heart were normal. Examination of the abdomen revealed no distension or rigidity. In the right groin was a small, tender, irreducible, firm mass.

There was a reducible left inguinal hernia also. The diagnosis of strangulated right inguinal hernia was obvious, and in view of the fact that only eight hours had elapsed since the onset of symptoms, and that the patient's general condition was fairly good, gangrene of the bowel was not considered preoperatively as a very likely possibility.

He was operated on under spinal pontocaine anæsthesia. When the sac was opened, a black loop of small bowel was found. Release of the neck of the sac, application of warm towels, and a delay of approximately fifteen minutes produced no demonstrable change in the appearance of the loop. From the middle portion the lustre was gone and the wall of the gut felt like wet tissue-paper. It seemed clear that if this loop were replaced within the abdomen, perforation would certainly occur.

By this time the operation had been in progress about thirty minutes and the old gentleman's condition had deteriorated perceptibly, his blood pressure being 100/70 and his pulse 120. We were reasonably sure that this change was not due to the spinal anæsthesia, for the following reasons: first, he had had the usual preliminary dose of ephedrine, 0.5 c.c. intramuscularly; second, the lateness of the onset of the signs of shock, third, the increase in pulse rate was greater than one would have expected if the changes were all due to the effects of the pontocaine.

It was obvious that the bowel would have to be resected and the hernia repaired as rapidly as possible, and in the simplest possible manner. In view of the gravity of the prognosis following resection, which has already been emphasized, and in view of the patient's age and general condition it was decided that exteriorization would be the safest procedure. Accordingly a short right paramedian incision was rapidly made, the gangrenous loop brought out through it, omentum being wrapped around the loop just within the peritoneum. The peritoneum was snugly closed around the afferent and efferent loops. No further closure of the abdominal wall was attempted, gauze packing being introduced down to the peritoneum around the exteriorized loop of the bowel. The hernia was rapidly repaired by the Bassini method. Dressings were applied and waterproofed and then a catheter was tied into the afferent bowel loop.

The benefits of an entero-anastomosis between the two loops were considered briefly, but it was decided not to carry out this additional procedure. An important factor in this decision was the temporary unavoidable absence of skilled assistants. Subsequently, in the postoperative period, it was realized that this simple measure could have been borne well by the patient, and had it been done, his stay in hospital would have been considerably shortened.

On his return to the ward after a procedure requiring an hour and a half of anæsthesia, the patient was in a state of moderately severe shock, pulse 126, blood pressure 90/60. He was given an immediate intravenous of 5% glucose and saline. His condition improved over the next hour to such an extent that intravenous blood serum or transfusion was considered unnecessary.

The bowel drained well through the catheter, no distension developed, and vomiting occurred only during the first twenty-four hours, not in much greater degree than the average postanæsthetic vomiting. The catheter cut out of the bowel on the fourth day and the nursing staff was then confronted with frequent discharges of irritating bowel contents on to the patient's abdomen. These were dealt with by almost hourly changes of dressing.

The patient improved slowly in a general way. Dehydration was minimized by the copious administration of fluids orally and intravenous fluids as required to maintain a daily output of over 1,000 c.c. of urine. We had not taken time at operation to ascertain accurately how close the gangrenous loop was to the ileo-cæcal valve, but from the appearance of the loop and its mesentery, and on the basis of percentage possibilities, we were reasonably sure the affected area was low down in the ileum. Experience in civil life with total colectomies has been that fluid balance and nutrition are not greatly disturbed by total exclusion of the colon. It was highly probable that the measures here employed would be adequate to tide the patient over a period of temporary embarrassment until the jejunum and upper ileum took over the function of absorbing adequate fluid and food to keep the patient in reasonably good condition and until entero-anastomosis could be safely performed. After the fourth day the introduction of a second catheter into the descending loop of ileum enabled us to attach a Murphy drip apparatus for the continuous administration of glucose-saline and peptonized milk into the lower ileum and colon. Vitamins A, B and C were also administered via this route. The exteriorized loop of bowel perforated on the sixth day, on the antimesenteric border and above the middle of the loop.

The herniotomy wound healed by first intention. When the sutures had been removed the general condition of the patient was fairly good and it was thought wise to attempt to get rid of the protruding loop of bowel as early as possible, in order to prepare the way for anastomosis between the afferent and efferent loops. In view of the perforation which had occurred due to the strangulation and the perforations deliberately made in the afferent and efferent ends of the loop, the exteriorized mass was grossly infected. Its presence would probably have increased the hazard of reopening the peritoneal cavity, whether through the same or another incision. For this reason its disposal seemed to be an essential preliminary to entero-anastomosis.

To sever it gradually, a narrow-bladed clamp was placed across the efferent loop and about half the mesentery. It was hoped that shock might be avoided by first introducing novocaine between the leaves of the mesentery, so as to block the nervous impulses at the time the clamp was applied. Unfortunately, this hope proved vain and, notwithstanding the fact that the mesentery was well infiltrated with novocaine, the application of a clamp resulted in such profound collapse that it had to be removed and measures to combat shock energetically applied.

A further period of recovery followed before attempts were again made to sever the bowel. Its severance was finally accomplished by gradually clamping very small successive portions of mesentery every few days until the entire loop was divided. On each occasion a mild transient episode of shock occurred.

The next stage was the operation to restore continuity of the small bowel. In view of the dramatic occurrence of shock with each attempt at severing the mesentery, a formal resection with end to end or side to side anastomosis was decided against, since this would have necessitated dividing mesentery and ligating vessels in it, and would have probably resulted in severe and even fatal shock.

The state of the skin of the abdominal wall was improved as much as possible preoperatively by applying continuous suction to the afferent loop for six days prior to operation. A transfusion of whole blood was given immediately preceding the operation. The visible ends of bowel were freed from the abdominal wall and the peritoneum, and the ileum was drawn out so far as to permit the performance of a rapid side-to-side anastomosis. This was replaced in the abdomen, the peritoneum snugly closed around the protruding two ends of ileum, and the wound packed and left open as at first, except that now the patient had a continuous gastro-intestinal tract.

For some days the two surface loops were left open, the afferent loop discharging its contents on to the surface as before. Then steps were taken to cut off the protruding loops down to the entero-anastomosis. Their severance was gradually accomplished by wrapping around them a narrow strip of gauze and around it the wire of a tonsil snare. The snare was gradually screwed tighter and tighter day after day for a total

of five days, finally severing completely the loops of ileum without producing any shock. The pain occasioned the patient by this manœuvre was minimal. During the time the ileal loops were occluded the patient's bowels moved normally and, of course, there was no discharge of bowel contents on the surface.

Following the severance of the protruding loops there was again a discharge of bowel contents through the ileostomy and also occasional natural bowel movements. A further period of three weeks ensued, during which the abdominal wound gradually became clean and small sloughs separated from the cut end of the mesentery.

Finally, the edges of the double ileal loops were freed from the abdominal wall down to the peritoneum and were invaginated. One hoped to avoid opening the peritoneum, but recent adhesions around the afferent loop separated sufficiently to cause a small opening into the abdominal cavity between parietal and visceral peritoneum. This was readily closed. Notwithstanding the fact that the scarred abdominal wall could not be completely brought together in front of this closure, the sutures in the bowel held; granulation tissue spread over the remaining muscular and fascial defect and the abdominal wound gradually healed.

On two occasions during this patient's course of treatment, *i.e.*, when the entero-anastomosis was done and when the ileum was closed, the peritoneal cavity was opened in the presence of a grossly contaminated wound, and yet no intra-abdominal and no wound infection occurred. Low virulence of the organisms present is probably a reason for this, but increased local immunity must also be considered an important factor. The technique of leaving an open wound drained by a light gauze pack played a further part by preventing the pocketing of pus.

The completely-healed paramedian scar consists of a narrow firm strip of dense scar tissue which at this stage appears to be as strong and as secure as the ordinary abdominal closure which has healed by first intention.

CONCLUSIONS

1. Mortality in strangulated hernia, when gangrenous bowel is present, varies from 20 to 100%.

2. A deliberately-planned multi-stage procedure in the case recorded reduced the surgical risk.

3. Excoriation of the skin and wound infection in the presence of an exteriorized loop of ileum do not constitute a formidable objection to multi-stage resection of the ileum.

4. Nutrition and fluid balance in the presence of an ileal fistula can be fairly readily maintained.

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MATERNITY STATISTICS*

BY F. SIDNEY HOBBS, M.D.

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I WISH to present the figures of the work done in the Vancouver General Hospital Maternity Building for the years 1933 to 1941 inclusive. This hospital, as most of you know, is one of the largest open maternity hospitals on the continent. It is a building separate from the other part of the hospital and contains 130 beds exclusively for maternity patients, all of whom are to be six months or over before being admitted. The cases covered in this report were delivered by 177 different doctors, exclusive of interns, and with such a large number of doctors it might be expected that our statistics would not compare well with those of the large teaching institutions with a small staff, all of whom would be specialists in this work. The great majority of our cases were delivered by general practitioners, and when you see the results obtained, I think you will agree with me that the figures compare very favourably with those of any of the large maternity hospitals on the continent.

Admissions.—In Table I you will see that the admissions in 1933 were 1,967, of which 1,081 were private patients and 886 were public. The total admissions dropped in 1934, 1935 and 1936, but since 1937 have shown a very marked increase, there being 3,050 admissions in 1941. It is interesting to note that the number of public patients has remained fairly constant until the last year, when there was a very marked drop to 396 public cases, compared with 2,654 private cases admitted.

Deliveries.—The number of deliveries, as would be expected, parallels very closely the number of admissions; the only thing I wish to

* Read at the Clinical Meeting of the Vancouver General Hospital Staff, March 31, 1942.

point out is that in column three there was a total of 623 patients admitted in false labour. Of these, 347 were private and 276 were public. It would be well for our staff to note this, and be more careful in admitting patients, those definitely not in labour being sent home again, thus conserving much needed hospital accommodation.

Normal deliveries.—For the nine years there were 18,539 deliveries, of which 13,359 were classed as normal, which is 72.2%. This I think is a very good figure in comparison with figures from other maternity hospitals.

Cæsareans.—During the nine years there were 612 Cæsarean sections, or 3.3%. The highest percentage was in 1935 when 69 Cæsareans were done, or 4.1%; the lowest year was 1934, when the percentage was 2.3%. These figures will refute the statement so often heard that too many Cæsareans are being done in the maternity building. The Royal Victoria Maternity Hospital in Montreal in 1940 reported a Cæsarean rate of 4.5%.

Version.—In 1933 52 versions were done; in 1934 this figure had risen to 63 in a total of 1,605 deliveries, or 3.9%. From 1937 on there was a very marked decrease in the number of versions done, in 1941 the total being only 3 in 2,771 deliveries, or 0.1%. The main reason for the great decrease in versions is that, when Dr. Burnett was in practice he did a great many elective versions, and his patients made up the majority of the total versions that were done in the hospital. I feel that the figure of 3 in 1941 is certainly an indication that we are becoming more conservative in our obstetrical management.

High-forceps.—The incidence of high forceps deliveries has always been very small, the highest number being 7 in 1940. During 1935

TABLE I.

Date	*Total*	*Admissions*	*Deliveries*	*False labour*	*Normal deliveries*	*Cæsareans*	*Percentage of Cæsareans*	*Versions*	*High forceps*	*Mid forceps*	*Low forceps*	*Breach*	*Twins*
1933	Total...	1967	1773	117	1363	45	2.5	52	3	61	249	63	20
	Private..	1081	1001	44	680	29		49	3	38	202	35	8
	Public...	886	772	73	683	16		3	—	23	47	28	12
1934	Total...	1773	1605	63	1111	48	2.3	63	2	69	312	53	16
	Private..	1204	1104	37	704	38		51	2	59	250	39	13
	Public...	569	501	26	407	10		12	—	10	62	14	3
1935	Total...	1806	1647	55	1245	69	4.1	26	—	67	240	48	19
	Private..	1240	1171	29	830	49		22	—	58	212	32	13
	Public...	566	476	26	415	20		4	—	9	28	16	6
1936	Total...	1923	1728	57	1265	48	2.7	31	—	59	325	63	20
	Private..	1332	1231	16	834	33		27	—	51	286	48	14
	Public...	591	497	41	431	15		4	—	8	39	15	6
1937	Total...	2154	1991	54	1447	61	3.0	22	2	62	397	105	25
	Private..	1579	1463	37	969	52		17	1	59	265	81	17
	Public...	575	528	17	478	9		5	1	3	32	24	8
1938	Total...	2471	2191	59	1547	70	3.1	13	5	102	454	89	12
	Private..	1787	1592	33	1042	58		9	2	85	395	70	11
	Public...	684	599	26	505	12		4	3	17	59	19	1
1939	Total...	2586	2343	80	1684	74	3.1	11	2	121	451	74	27
	Private..	1813	1748	45	1168	68		11	2	102	397	58	22
	Public...	773	595	35	516	6		—	—	19	54	16	5
1940	Total...	2,746	2,490	76	1,763	87	3.4	8	7	121	504	88	23
	Private..	2,134	1,970	55	1,306	82		5	7	111	459	69	20
	Public...	612	520	21	457	5		3	—	10	45	19	3
1941	Total...	3,050	2,771	62	1,934	110	3.9	3	5	149	570	105	32
	Private..	2,654	2,426	51	1,634	101		3	5	146	537	95	31
	Public...	396	345	11	300	9		—	—	3	33	10	1
Total..	Total...	20,476	18,539	623	13,359	612	3.3	229	26	811	3,502	688	194
	Private..	14,824	13,706	347	9,167	510		194	22	709	3,103	527	149
	Public...	5,652	4,833	276	4,192	102		35	4	102	399	161	45

and 1936 no high forceps deliveries were done. There have been no high-forceps deliveries on public patients in the last three years.

Mid-forceps.—The number of mid-forceps deliveries remains at a fairly constant number in relation to the deliveries.

Low-forceps.—There was a total of 3,502 deliveries by low-forceps, which gives an incidence of 5.2%, a very conservative figure.

Breech.—There were 688 breech deliveries, or 2.7%, which is about the usual percentage given in the obstetrical textbooks.

Twins. — There were 194 sets of twins, or 0.9%, which is also about what one would expect.

This table covers the lacerations, episiotomies, mortality, etc.

First-degree lacerations. — These have remained fairly constant in relation to the number of deliveries until the last four years when there has been a very decided decrease.

Second-degree lacerations.—These have also shown a marked decrease; in 1933 there were 105; in 1936 110; in 1938 126; in 1939 136. From that year there has been a very marked drop, there being only 95 in 1940, and 75 in 1941.

Third-degree lacerations. — These, as can be seen from the table, have never been very high, a total of 8 in 1933 and 8 in 1936 being the two high figures over the nine years. The fact that we have had only 2 third degree lacerations on the public patients in the last three years is, I feel, very commendable, when we consider that the majority of the public cases are delivered by interns who have not had a great deal of practical training in obstetrics.

Episiotomies.—The incidence of episiotomies is one of the most interesting of the columns in this table. In 1933 the total number done was 157. This has shown a very marked increase

TABLE II.

Date	*Total*	*Deliveries*	*1st degree lacerations*	*2nd degree lacerations*	*3rd degree lacerations*	*Episiotomies*	*Percentage of episiotomies*	*Puerperal morbidity*	*Percentage of puerperal morbidity*	*Maternal mortality*	*Percentage of maternal mortality*	*Living births*	*Still-births*
1933	Total..	1,773	467	105	8	157	8.7	83	4.6	10	0.5	1,725	58
	Private.	1,001	279	76	6	144		35		8		970	35
	Public .	772	188	29	2	13		47		2		755	23
1934	Total..	1,605	370	87	5	213	13.2	87	5.4	9	0.5	1,612	53
	Private.	1,104	288	78	4	195		40		6		1,116	33
	Public..	501	82	9	1	18		47		3		496	20
1935	Total..	1,647	449	108	5	233	13.5	74	4.4	5	0.3	1,607	40
	Private.	1,171	346	81	5	202		38		4		1,143	28
	Public..	476	103	27	—	31		36		1		464	12
1936	Total..	1,728	413	110	8	322	17.6	109	6.1	6	0.3	1,706	36
	Private.	1,231	314	78	7	273		50		5		1,230	24
	Public..	497	99	32	1	49		59		1		476	12
1937	Total..	1,991	319	105	4	465	23.3	109	5.4	1	0.05	1,951	48
	Private.	1,463	223	88	3	396		51		1		1,432	35
	Public..	528	96	17	1	69		58		—		519	13
1938	Total..	2,191	376	126	5	623	28.4	165	7.5	4	0.1	2,149	42
	Private.	1,592	317	107	1	499		120		4		1,653	31
	Public..	599	59	19	4	124		45		—		496	11
1939	Total..	2,343	366	136	3	758	32.3	175	7.4	1	0.04	2,288	55
	Private.	1,748	320	111	2	597		144		1		1,728	45
	Public..	595	46	25	1	161		31		—		560	10
1940	Total..	2,490	424	95	3	880	35.3	170	6.8	5	0.2	2,436	54
	Private.	1,970	366	86	3	691		144		5		1,929	41
	Public..	520	58	9	—	186		26		—		507	13
1941	Total..	2,771	486	75	7	1,015	36.6	148	5.3	1	0.03	2,725	61
	Private.	2,426	421	70	7	928		131		1		2,440	46
	Public..	345	65	5	—	87		17		—		285	15
Total..	Total..	18,539	3,670	947	48	4,666	25.1	1,119	6.0	43	0.2	18,199	447
	Private.	13,706	2,874	775	38	3,925		753		35		13,641	318
	Public..	4,833	796	172	10	741		366		8		4,558	129

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over the years, until in 1941 the extremely high figure of 1,015 episiotomies were done in a total of 2,771 deliveries, or 36.6%. What are the reasons for this extremely rapid increase in the number of episiotomies? I would like to suggest the following: (1) a more uniform method of teaching in the medical schools, whereby most students now are taught to do episiotomies instead of getting lacerations. (2) Use of the barbiturate drugs combined with low forceps delivery and episiotomy, which is used by a great many men in delivering their primiparous patients. (3) More doctors confining their work to this specialty, particularly in the past ten years.

Puerperal morbidity.—The definition of puerperal morbidity used is a temperature of 100.4° or more on two successive readings within twenty-four hours, excluding the first twenty-four hours following delivery. The puerperal morbidity remained fairly constant until the last two years, in which it has shown a very decided decrease, the total in 1941 being only 148, or 5.3%. I wonder if the introduction of sulfonamide drugs has had much to do with this very decided decrease? I do not think that we see nearly as many severely infected patients as we used to see on the wards eight or ten years ago.

Maternal mortality. — Coming to maternal mortality I feel that here again we have some very interesting figures. In 1933 there were 10 deaths in the Maternity Hospital, a total of 8 private and 2 public. The mortality rate since 1933 has shown a very good decrease, the two lowest being 1939 and 1941 when there was only one death in each of these years.

There were 42 deaths in the nine years. The causes of death have been briefly summarized as follows:

Toxæmias	9
Infections	7
Embolus	2
Hæmorrhage and shock	11
Cardiac conditions	6
Miscellaneous	7

These figures show that there is still room for improvement as, with more adequate pre-natal care, the deaths from toxæmias should be reduced to nearly zero; with the sulfonamide drugs, transfusions, etc., we should be able to reduce the deaths from infection; and with more careful and conservative obstetrics the deaths from hæmorrhage and shock should be reduced. Embolic deaths have been few and are more or less uncontrollable. The six deaths from cardiac conditions might possibly be reduced, but I think we will always have a certain number of deaths from cardiac complications of pregnancy.

Living births.—These show a fairly constant ratio to the number of total births.

Still-births.—These have shown a very encouraging decrease. In 1933 there were 58 and in 1941 only 61. These figures, when compared with the number of deliveries, are very encouraging.

These headings and figures could be increased to greater length. The significant things that I feel we should learn are summarized as follows.

SUMMARY

1. That we have one of the largest maternity hospitals on the continent.
2. That our Cæsarean rate is only 3.3% over the 9 years.
3. That the incidence of version has decreased tremendously in recent years.
4. That the number of episiotomies done has increased very rapidly.
5. That the puerperal morbidity for this hospital is surprisingly low.
6. That the maternal mortality is low and has shown a very encouraging decrease from 1933 to 1941.
7. That the still-births have also shown a well marked decrease.

RÉSUMÉ

Dans cette maternité qui est une des plus grandes d'Amérique, le taux des césariennes fut de 3.3% pour les 9 dernières années; les versions se font de moins en moins; le nombre des episiotomies atteignait en 1941, 36.6%; la morbidité puerpérale est très basse: 5.3%; la mortalité maternelle se chiffre à 42 décès en 9 ans; les morti-natalités décroissent constamment.

JEAN SAUCIER

TUBERCULIN TESTING OF YOUNG ADULTS WITH PARTICULAR REFERENCE TO THE VOLLMER PATCH TEST*

BY FRANK G. PEDLEY, M.D., D.P.H.

Montreal

MOST physicians of over ten years' standing regard the tuberculin test as a useful thing in childhood but of relatively little value in maturity, since it is almost certain to be positive. This view, which was probably correct twenty years ago, is not valid today. The fact is that many, if not most, young adults nowadays show a negative tuberculin reaction. The percentage of negative reactors in the age-group 18 to 25 varies considerably from place to place. It may be as low as 30% or as high as 80%. More often than not well over 50% of young people show a negative tuberculin reaction.

The realization of this fact should put the tuberculin test in the armamentarium of every physician for use not only in children but in young adults as well. Individuals who show indefinite shadows in the chest by x-ray sometimes are negative to tuberculin. So, too, are some individuals with erythema nodosum or even pleurisy with effusion. The knowledge that a patient with conditions of this sort is tuberculin-negative is important. Perhaps more useful still is the reaction in the case of fatigable individuals who have indefinite complaints which might well be associated with tuberculosis. A negative reaction to tuberculin in such persons (provided the reaction is really negative) is strong evidence against tuberculosis. It is possible that a positive reaction in a person who has recently been negative may have a peculiar significance.

So far as I know no definite syndrome characteristic of early tuberculous infections has been described. Israel, Hetherington and Ord[1] have hinted that such a syndrome may exist. In the case of nurses whom they have followed by means of the tuberculin test repeated frequently, they say: "The occurrence of vague, poorly localized, symptoms among adults at the time of tuberculous infection has been described by numerous European observers, and Scandinavian investigators have noted the frequency of abdominal symptoms so closely simulating appendicitis that laparotomy is often performed." In the experience of Israel, Hetherington and Ord morbidity was almost twice as high among nurses during the 4 months' period immediately preceding the development of a positive tuberculin test as among nurses in general, and operations for appendectomy were three times as frequent in this period as in the other nurses. Further investigation is needed before one can consider that early tuberculous infection has a characteristic clinical picture.

From time to time doubt is cast on the reliability of the tuberculin test as an index of infection. Lumsden *et al.*[2] for example, reported simultaneous tuberculin tests on 450 school children, using different lots of tuberculin and found the following variations:

Purified protein derivative 0.0005 mgm...	11.8% positive
Old tuberculin (lot 511)	52.6% "
" " (lot 771)	78.6% "
" " (Mich. State)	19.4% "

The experience of Lumsden and his associates is certainly not that of the majority of physicians. Those who use the tuberculin test much recognize its worth, and are inclined to place considerable trust in a negative reaction. In the routine supervision of certain groups it appears to have earned a place. In the case of medical students and nurses it seems to provide a good index of exposure to tuberculosis, and may be even a means of detecting faulty technique in handling patients.

One great difficulty in the use of tuberculin in groups is the necessity of frequent visits for repeated testing when preliminary tests are negative. Even with purified protein derivative (P.P.D.), which is thought to be a better standardizable material than other types of tuberculin, at least two tests, necessitating three visits, are needed to declare a reaction really negative. The American Student Health Association has been active in promoting the use

* From the Department of Public Health and Preventive Medicine, McGill University.

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of the tuberculin test in young adults and it has repeatedly emphasized the importance of adequate dosage. By this is meant that the individual should not be declared negative to tuberculin unless he fails to react to 1 milligram of old tuberculin (O.T.) or 0.005 milligram of P.P.D.

When Vollmer introduced the patch test it was thought that, with children at least, it might meet the objection raised against repeated tests and in general it may be said that it does. The number of children who fail to react to the patch test and at the same time react to some other technique, hardly exceeds those who fail to react to another technique and yet react to the patch test. This test has additional advantages namely, (1) no needle is used; (2) it can be applied by non-medical personnel and only has to be seen by a physician for interpretation; and (3) it keeps well.

The literature on the patch test has recently been well reviewed by Kereszturi[3] and need not be reviewed again here. It is notably silent on the reliability of this test in adults. I have heard it said more than once that the patch test is very good in children but unreliable in adults. In order to test the truth of this statement some 486 medical and dental students at McGill University have been tested simultaneously with the patch test and the Mantoux test, using O.T. donated by the Connaught Laboratories.* The same lot of O.T. was used in all cases but different batches of patch tests were used. The procedure was to place a patch test on the flexor surface of one forearm and at the same time do a Mantoux test with 0.1 mgm. O.T. on the opposite forearm. The patch test was left in place for 48 hours, during which time it was kept dry. It was then removed by the student and 48 hours later (96 hours after the application of the tests) both tests were read. If one or other test was positive no further test was done. If both were negative a second Mantoux test was done, using 1 mgm. O.T.

A detailed analysis of the students is not given. Practically all were between the ages of 20 and 30 years. About 60% were Canadians and the balance from the United States, with a sprinkling from England, South Africa, and South America. The results of the tests are given in the following table:

MANTOUX AND PATCH TESTS, MEDICAL AND DENTAL STUDENTS 1938-1941

Number of reactions	486
Number neg. to patch and neg. to Mantoux 0.1 mgm.	285
Number pos. to patch and pos. to Mantoux 0.1 mgm.	172
Number neg. to patch and pos. to Mantoux 0.1 mgm.	21
Number pos. to patch and neg. to Mantoux 0.1 mgm.	8
Number neg. to patch and neg. to Mantoux 0.1 mgm. but pos. to Mantoux 1.0 mgm.	22

The interpretation of the above results is as follows: (1) Of the 486 students 223 (45.9%) reacted positively to tuberculin; (2) 285 students reacted negatively to the patch test and 0.1 mgm. O.T.; 172 reacted positively to the patch test and 0.1 mgm. O.T. There was thus agreement in the case of 457 students (94.0%); (3) if the patch test had been relied upon solely 43 students among the 486 would have been classed incorrectly as negative reactors (8.8%); (4) if 0.1 mgm. O.T. had been relied upon solely 30 students among the 486 would have been classed incorrectly as negative reactors (6.2%); (5) of the 306 students negative to the patch test 43 reacted positively to O.T. (0.1 mgm. or 1.0 mgm.) (14.1%); (6) of the 293 students negative to 0.1 mgm. O.T. 30 reacted positively to 1.0 mgm. O.T. or to patch test (10.2%).

It should be mentioned at this point that, although the above figures refer to 486 different students, many of them have been tested several times, for it is our practice to re-test all negative reactors at least once a year, and sometimes oftener.

As a result of this experience with the patch test I not infrequently use a patch test by itself on individual cases and then, if negative, proceed directly to 1.0 mgm. O.T. On one or two occasions fairly severe reactions have occurred. These reactions have not been alarming, but have led to a re-examination of the patch test area. In every instance a slight reaction has been noted which had either been missed in the first instance or had appeared later than 96 hours.

The conclusions which I believe may be drawn from the experience with the patch test at McGill are these:

1. A positive patch test is evidence of specific allergic response to tuberculin.

2. In adults the patch test may be considered to be of about the same order of sensitivity as 0.1 mgm. O.T. intradermally.

3. In the mass-testing of groups, if one is prepared to accept an error not in excess of 10%, and more likely nearer 5%, the patch test

* This study was financed under a grant from the Cooper Research Fund, Faculty of Medicine, McGill University.

may be used. If fraud is a possibility precautions must be taken to ensure that the test is left in place for the required 48 hours.

4. In clinical diagnosis the 5 to 10% error of the patch test or the 0.1 mgm. O.T. is too great to be ignored. A negative test should therefore be repeated, using a stronger tuberculin solution.

5. Although the use of O.T. or P.P.D. intradermally must be considered the most reliable method of tuberculin testing, the patch test nevertheless has a valuable place in physicians' offices, largely because of its keeping qualities and its ready availability. Probably the greatest hindrance to the routine use of tuberculin in private practice is the fact that solutions must be fresh. The patch test material keeps well for several months and is a good means for detecting positive reactors.

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Case Report

STRANGULATED INGUINAL HERNIA ASSOCIATED WITH PERFORATED ILEUM

BY THOMAS E. NUGENT

Bath, N.B.

The patient, a wiry little man of 69, was dragged by his runaway horses over a stretch of rocky ground for a distance of some 30 feet. This occurred at 4.30 p.m. on August 18. He was brought to me at 5.00 p.m. complaining of: pain and swelling in the scrotum; pain in the abdomen; vomiting.

Examination revealed a right inguinal hernia, irreducible; generalized lower abdominal tenderness; systemically, signs of well advanced generalized arteriosclerosis. Temperature 96.2° F.; pulse 60; respirations 20; white blood cells 6,800. No marked signs of shock.

The patient was transported by ordinary passenger car to hospital, a distance of 30 miles. He was prepared for operation at 7.30 p.m.

The preoperative diagnosis was strangulated inguinal hernia with possible perforation of small bowel.

Under local infiltration anæsthesia (novocaine) the inguinal canal was opened. The hernial sac contained a loop of bowel about four inches in length, purplish in colour. On opening the sac sero-sanguineous fluid was disclosed, apparently from the peritoneal cavity. Loops of small bowel brought down into the incision showed areas of plastic peritonitis. No perforation could be demonstrated in any loop accessible through the hernia incision. As the colour returned to the incarcerated loop it was returned to the abdomen and the hernial repair completed by the Bassini method.

Under local infiltration anæsthesia a mid-line abdominal incision was made. On reaching the peritoneal cavity, as the pulse rate started to mount, inhalation anæsthesia (gas oxygen) was commenced. The peritoneal cavity on being opened was seen to contain a moderate amount of sero-sanguineous fluid. Sulfathiazole powder, one dram, was first dispersed through the cavity. Exploration then revealed a bullet-like puncture wound in the ileum about four inches from the cæcum. This was dusted with the powder and closed by purse-string suture. A soft rubber drain was inserted and the abdomen closed in layers. Sulfathiazole powder was massaged into each layer successively, two additional drams being used.

Progress notes.—August 19 to 23.—Given 750 c.c. 10% glucose in saline twice daily. Prostigmine 1 ampoule every 8 hours. Sulfathiazole gr. xv every 4 hours. Hot fomentations to abdomen. Temperature for these days remained below 99° F. Pulse below 80. No vomiting. No distension. Little or no drainage from tube.

August 24.—Whole blood, 500 c.c., given to prevent over-dilution of the blood stream with glucose-saline. Prostigmine discontinued. Mineral oil ounces ½ t.i.d. exhibited. Soft diet.

August 25.—Sulfathiazole discontinued.

August 25 to 29.—Soft diet. Drain removed August 29. Bowels moving with mineral oil. Patient perfectly comfortable, eats well, sleeps well, no distension. Temperature and pulse normal.

September 6.—Patient discharged; incisions nicely healed.

CONCLUSION

The aged subject of peritonitis, aided by sulfathiazole and expertly watchful nursing care, has, in some instances, almost fantastic recuperative powers.

Clinical and Laboratory Notes

DARK FIELD EXAMINATION OF PENILE LESIONS*

BY ARNOLD BRANCH, M.D.

Saint John, N.B.

The method of dark-field examination for demonstrating the presence of spirochætes morphologically similar to *Treponema pallidum* in the diagnosis of early syphilis is so universally accepted, and the published results of the large numbers performed in the last war seem so final that very little is written about the method at the present time. It appears that physicians today are too prone to wait for a serological diagnosis. Precious time is wasted before treatment is started and persons with primary syphilitic lesions are allowed to be at large unwitting of the nature of their lesion.

I have had cause during the present year to examine over a hundred penile lesions distributed among the Armed Forces, seamen and civilians, and have listed in Table I the results of one hundred consecutive such examinations. The series is not large enough to draw any statistical conclusions. The percentage of positives (52%) is about the same as that obtained in a much larger series in the last war but not as high as some of the published figures.[1] The present series includes two cases which were obviously furuncles, one wart, a case which had received six treatments, and several in which lesions had been present for six weeks, as well as one lesion which was not more than a scratch on which the patient desired a "clear bill".

TABLE I.

RESULTS OF ONE HUNDRED DARK FIELD EXAMINATIONS. PENILE LESIONS

Number	*Treponema pallidum positive*	*Treponema pallidum negative*	*Spirochætes present, not Treponema pallidum*
100	52	48*	15 (4 with *T. Pal.*)

*Includes 11 with non-specific spirochætes.

As a result of having made these examinations in a relatively short period of time I would like to reiterate and stress certain things which stand out very clearly. The first is that, clinically, it is not possible to diagnose every syphilitic chancre even if a pair of gloves is donned and the lesion palpated as well as inspected. Hardness, lack of pain and inguinal swelling are still the cardinal signs, but positives are often found in the non-classical lesion. The second point, which is illustrated by the Table, is that non-specific spirochætes are frequently found in penile lesions, in some cases associated with *Treponema pallidum*. There is a type of lesion associated with tenderness, chronicity, a foul odour, and a sloughing base which is classed with the "soft" chancre or chancroids, but which undoubtedly is a Vincent type of spirochætal infection. From a technical standpoint most of these non-specific spirochætes are easy to differentiate from the *Trep. pallidum* morphologically, but in some cases, as in No. 87, they were very fine and exclusion could only be made by one trained in this type of microscopy. This particular case was serologically negative in the follow-up and allowed us the opportunity of deciding that the criteria we were using for recognizing *Trep. pallidum* were not too stringent. This latter organism has a stiffness, fineness, mathematical regularity of coil and fixity of progression in a set course which are so characteristic that one unconsciously recoils on seeing them.

A third point which should be self-evident is that a single negative dark-field examination does not rule out the diagnosis of syphilis. The examination should be frequently repeated. This, unfortunately, was not possible in the majority of our negatives, but many were repeated a second time after the lapse of a few days. In some of the lesions which we reported as "no spirochætes found", including the repeats, we have had the regrettable experience of a positive serological test developing later. The lesions which one fails to diagnose positive by dark-field examination and which turn out later to be syphilis are usually old (30 to 40 days), secondarily infected, and even purulent or so tender that the patient does not allow the necessary firm pressure that will produce the deep serous exudation which is most likely to yield spirochætes. Very occasionally a scab may be so adherent that soaking will not loosen it and the examination is unsatisfactory.

The final point I should like to make is that it is possible to perform a dark-field examination on the exudate taken at a distance and shipped to the laboratory. In only one instance was this done in our series and on the examination two days later a positive diagnosis was made.

Serological follow-up of the negative dark field examinations.—Only 33 were traced, the absentees being mostly seamen whose later records were not on our files. Of these 33 negatives 6 developed a positive Wassermann and Kahn reaction. The comparable figures given for the larger series in the last war previously quoted were 14% and 14.9% respectively.[1]

Serological findings in the cases which showed both Trep. pallidum and non-specific spirochætes.—It was possible to check 3 of these 4

* From the Bureau of Laboratories, Province of New Brunswick, Saint John, N.B.

cases. Two became strongly positive, but none of a number of tests performed at intervals has been positive in the third case. As his five known contacts were also negative it is quite possible that the diagnosis in this instance may have been incorrect.

CONCLUSION

All that this note intends to stress is that it is in the interest of the patient, his contacts, public health and the physician himself that an early diagnosis of syphilis be made. This can be done in over 50% of cases by the dark field examination before the serological diagnosis is possible. The fact that a diagnosis can be made by shipping exudate from a suspected lesion to a laboratory equipped to make the examination should recommend its more frequent practice. The physician with gloved hands cleans the lesion with absorbent cotton, squeezes it firmly, wipes away the blood and massages out some exudate which he draws up into a capillary pipette and seals it at either end with a mixture of half beeswax and half vaseline. He may always repeat it if the report is not positive and he for whatever reason suspects syphilis.

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ANÆSTHETIC MYSTERIES

BY FRANK N. WALKER, M.A., M.D.

Toronto

About a year ago (July, 1941) reports began to appear in the *British Medical Journal* of means taken to avoid "ether convulsions". In these short statements, one is impressed by the way in which British anæsthetists were mystified by this puzzling condition. It speaks well for this body of men, when we observe the speed with which they advanced their methods of overcoming the patient's adverse condition.

The real controversy began as to whose method was the best. Some changed over to evipan, while others changed to chloroform with equally satisfactory results. These various remedies proved but one thing, that the convulsions ceased when ether-administration was stopped, and that ether was likely the cause of these unpleasant experiences. Edwards' report that the spasms were expiratory helps to support this view. It would seem as if the patient by a subconscious reflex were trying to expel the poison from his lungs. Wells believed that the cause was toxic and that this toxicity was produced by the temperature to which the anæsthetic material had been heated.

It is just such perennial discussions as this, which have kept anæsthetists searching for a more reliable anæsthetic.

When an anæsthetist opens a can of ether and finds the administration satisfactory he is inclined to remind his colleagues that ether after all is very reliable. If the container was a large one, he may use the remainder two days later and run into every possible difficulty of administration. The patient or himself is the first to come under scrutiny, because the same ether was so satisfactory when formerly used.

The nature of the material labelled "anæsthetic ether" is too infrequently explained. The real virtue of ethyl ether, as industrialists have learned, is that of a solvent, and in anæsthesia it likely has this nature as its chief function; for it will dissolve almost all hydrocarbons. In this capacity it can prove to contain the "makings" of very toxic substances, as well as those capable of producing satisfactory anæsthesia.

On account of its inflammability, this ether is usually packed in cans, thus avoiding breakage while being moved or transported. I think I have proved however, that the storage can, in some cases at least, acts as a catalytic when the fluid has come into contact with the oxygen of the air. This was first observed about two years ago by measuring the distance ether fumes could be recognized. A newly opened supply still in the container will often not be recognized beyond two feet, while a sample which has been poured back into the can and carried about in a motor car, imperfectly corked, for a couple of days can be smelled as far away as ten or twelve feet. I have no hesitation in saying that this odour is not ethyl ether, but due to oxidation products.

Tests were made by pouring small quantities of ether from one can to another, then allowing them to evaporate down to small quantities. The residue had quite a vile odour. The intensity of the odour varied with storage in a glass bottle and in different kinds of cans. Some of the English cans are very finely plated inside. Only in one of these did the odour approach other samples at hand. On cutting this can open a rust patch along the joining line was present.

What the substances may be which are produced by oxidation is beyond the scope of most anæsthetists to ascertain. The one piece of apparatus which he always has with him is his nose. If his olfactory sense is well developed he can recognize some of the common organic compounds. I have recognized sulphur dioxide, acetylene, and mercaptan alcohols. In producing small quantities of these last substances one must think of old Neptune who had all the stormy winds locked in a cave to be turned loose at will. Here we have all the bad odours of all the bad ether locked in a can.

The professional anæsthetist is at this disadvantage, that he may not control his own ether supply. He does not know except by the smell how many times it has been poured out of the can and back into it again.

In giving anæsthetics privately I have strictly held to the rule during the past year of always beginning induction with a fresh supply of ether, opened only a few minutes before the anæsthetic is to begin. The lid of the can is perforated in two places only by a two millimetre wire. One of these openings is in the centre so that it can be controlled by the finger. By a proper mask the concentration of exhaled carbon dioxide on the part of the patient prevents the oxidation of the "makings" contained in the anæsthetic material becoming toxic. I feel that the presence of carbon dioxide in anæsthetic material is chiefly useful for its control of the oxidation of latent toxins.

By the method described above, salivation and partial paralysis of the tongue and pharyngeal reflexes are very infrequent, and many other worries frequently found in early ether induction are avoided.

Editorial

THE EXPANDING PATHOLOGY OF POLIOMYELITIS

THE virus of poliomyelitis has a relatively limited distribution in the human body, the careful experiments of Sabin on seven human cases showing that active virus was only demonstrable in the nervous system and alimentary tract of the infected host. The characteristic histological degenerative lesions are not limited to the spinal cord but have been found throughout the whole motor tract, including the motor cortex. The nuclei of the various cranial nerves in the medulla, the roof nuclei in the cerebellum, the tectum and tegmentum in the mid-brain, the thalamus, hypothalamus and globus pallidus may be the seat of lesions, while the olfactory bulbs are not involved in human cases. The perivascular and meningeal inflammatory lesions are more diffuse, but it is an interesting finding that virus has not been demonstrated in the spinal fluid or blood. The posterior root ganglia show lesions, but they are much less frequently found in the posterior horns of the spinal cord. It seems that the virus is strictly neuronotropic and that the path of infection is by the axis cylinders. The name "anterior poliomyelitis" is thus highly descriptive, since the predominant lesions are in the grey (polios) matter of the marrow (myelon)—in this case the spinal cord—and especially in the anterior motor horn. However, as stated above, there is growing evidence that there is besides a specially localized encephalitis and ganglionitis accompanying the myelitis.

In order to fully comprehend the pathological physiology of poliomyelitis it is well to recall the normal histology and physiology of the motor neurone, since it is this cell which bears the brunt of the damage. The motor neurone is a highly specialized cell with several dendrites and usually only one axis cylinder. It contains a large central nucleus with nucleolus and many specialized fibrils and granules which are brought out by special staining methods. The so-called Nissl's, or chromophile, granules give the cell a tigroid appearance. The nerve fibre arising from it is composed of the central axon, the myelin sheath and the outer sheath of Schwann, which latter is not present within the central nervous system. This is of importance, as the sheath of Schwann takes part in regeneration. As they become peripheral, numerous motor nerve fibres join with sensory fibres to form a peripheral nerve. Each nerve fibre from a single lower motor neurone ultimately divides on entering a voluntary muscle to supply over a hundred muscle fibres which together form the "motor unit". The motor unit usually corresponds to the anatomical unit or muscle fasciculus which is recognizable to the naked eye, but its component muscle fibres are of microscopic size.

The degeneration which occurs in a neurone when it is injured is spoken of as Nissl's degeneration and is accompanied by a disappearance of Nissl's granules (chromatolysis). In the process the cell becomes swollen and rounded, the nucleus eccentric or marginal and later disappears as cell death occurs. In the latter event the nerve fibre undergoes Wallerian degeneration which consists of fibrillation and disintegration of the central axis cylinder, fragmentation of the myelin sheath into droplets, and proliferation of the cells of the sheath of Schwann which become phagocytic and function by

removing the damaged myelin sheath and axis cylinder. In muscle the most obvious features of denervation, according to Solandt[3], are physiological fibrillation, changes in electrical and chemical excitability, and, later, atrophy. The three first are probably correlated, one essential feature being that the muscle becomes hypersensitive to acetylcholine so that it will react to concentrations normally present in tissue and blood with resulting fibrillation. This fibrillation begins on the fifth day and may persist for several weeks (Denny-Brown and Pennybacker[7]). The atrophy which subsequently occurs in muscle following denervation is a loss of weight chiefly in the contractile elements or fibrils of the muscle fibres, with a later absolute increase in connective tissue. Regeneration will occur in a lower motor neurone if it is not completely destroyed and in about three weeks the cell is restored to normal and the continuity of the fibre re-established.

To turn now to the special pathology of poliomyelitis there is some evidence to support the thesis that an anterior horn neurone invaded by the virus may respond in four different ways (Irwin): (1) no anatomical involvement; (2) temporary alteration in function by contiguous acute inflammatory congestion and œdema; (3) partial destruction by the direct action of the virus; and (4) complete destruction. The histological changes which occur in the neurone have been aptly described by Sabin[3] as the "pathological unit" of poliomyelitis. This consists of chromatolysis, Nissl's degeneration, with occasionally the development of intranuclear inclusions, necrosis of the cell, which is then invaded by polymorphonuclear leucocytes (neuronophagia), and later the dead tissue is removed and the gap is filled in by neuroglia. All that is now recognizable is a paucity of ganglion cells in the particular "scarred" area. Short of death of the neurone the process is reversible and the muscle paralysis only transitory. This has been demonstrated in monkeys by finding typical cord lesions in animals which have had only a temporary paralysis after experimental infection. To complete the picture, besides the degenerative lesions above described there also occurs a greater or lesser amount of perivascular and meningeal exudation with cells of the mononuclear type, in most instances lymphocytes and glial cells, but the exudative lesions are now considered as secondary to the degenerative. In the muscle supplied by the destroyed neurones after the initial fibrillation the essential lesion is a primary atrophy. This is soon accompanied by an increase in the peri-fascicular connective tissue, and later the complete atrophied muscle is filled in either by fibrous tissue or fat. Secondary atrophy may occur in healthy muscle fasciculi which are cut off as islands in a sea of fat or in other healthy muscle fibres as a result of disuse (Hipps[4]). This author has also described streaks of fibrosis traversing muscle not in fascicular distribution, which he explains as being due to rupture from sudden stress and subsequent healing.

It is a happy coincidence that these newer facts concerning the distribution of the pathological lesions have been educed at the time that Sister Kenny's novel observations on certain early clinical signs in the disease have had the spotlight of scientific criticism focussed on them. For the diverse distribution of the degenerative lesions particularly in the mid-brain furnish a background for a receptive scientific attitude for what she now describes as spasms, inco-ordinations, tremors and mental alienation. It has already been shown by the oscillograph that spasm occurs early in poliomyelitis in both the antagonists and in the weakened muscles themselves (Schwartz and Bowman[8]). The actual basis of these symptoms has not been definitely explained and it is interesting to speculate as to whether the fibrillation of denervation, meningeal irritation, or the basal ganglionitis, singly or in combination, may not be the final explanation, rather than the myositis which Sister Kenny has envisioned to explain them (Pohl[5]) but of which there is at present no proof.

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Editorial Comments

Medicine in Soviet Russia

We have received from Professor Kogan-Yazny of the Soviet Scientists Anti-Fascist Committee a brief account of the achievements of therapy in the U.S.S.R. within recent years. Professor Kogan-Yazny's hope is that exchange of information "will contribute to further cooperation of our free countries and to our common struggle against Hitlerism". And with that we heartily agree.

The communication was received by radio and does not lend itself to exact reproduction. It begins with the statement that the history of internal medicine in Russia is associated with the names of three brilliant investigators, Zakharjin, Botkin, and Ostroumov. These men were largely responsible for developing the present day Russian clinical school. The famous Pawlov as early as 1894 wrote: "Botkin is the best specimen of legitimate and fruitful union between medicine and physiology, that is, between those two varieties of human activity that are erecting the modern edifice of knowledge of the human organism. It promises to secure the best fortune of man, his health and life".

Following on this is an account of various developments in medical thought and outlook, which parallel those of our own country. A number of special journals have also been brought into being.

Special emphasis is laid on the establishment of institutes and clinics of curative nutrition in Moscow, Kharkov, Kiev, Leningrad and other cities, and mention is made of work in tuberculosis, cardiovascular disease, the endocrines, blood dyscrasias and vitamins.

Obstacles of distance and language, not to mention the war, make the interchange of medical knowledge difficult between our two countries, but this attempt to overcome them seems to be especially appropriate at the moment.

The Medical Man in the Army

There is probably no civil profession which is less encroached on by the requirements of the army than that of medicine. War demands everything of those on active service, but the medical man has the unique advantage of being able to adjust his training to these demands.

This however, like most generalizations, is only partly true. We are reminded by Major H. P. Wright* that army life also contains for the medical service long periods of inactivity with only occasional punctuations of activity. These long stretches are very difficult to fill in. The instance is well quoted of William Beaumont and his solution of the problem, but a man may wait for long before he has such an opportunity as was given Beaumont. Still, there are other ways of facing the matter, and Major Wright has done a service in pointing them out. He reflects (as he has every right to do) the spirit of Osler in his exhortations to every medical officer to keep his eyes open (and his mouth shut!) and to make notes on what interests him. We all know how difficult it is to do any writing in the army. The military atmosphere is not that of the study: how can it be? But even in the army work can be done if enough resolution is shown. The sources of the literature are not easily come by under these conditions, but we can recall instances in the last war of men producing worth-while contributions under apparently insuperable difficulties. Even if nothing is produced at the moment, invaluable notes on series of cases can be made and put aside for future development. We have in mind one medical officer in that war whose persistent habit of note-taking was of incalculable value in later historical accounts.

Most freely do we welcome and endorse Major Wright's well-timed homily.

* Royal Canadian Army Medical Corps, *McGill Medical Journal*, 1942, 11: 86.

Sulfonamides in Industry

Our Secretary has received a letter from the Industrial Accident Prevention Association, Inc., with regard to the potential hazards of the sulfonamides amongst industrial workers. The U.S. Department of Labour apparently has issued a warning to safety supervisors to watch for those who have been recently treated with the sulfonamide drugs, on account of the possible after effects of mental confusion, and the question is whether such a warning should be broadcast to Canadian industry.

The matter was referred to our Committee on Pharmacy, and the chairman, Dr. V. E. Henderson, points out that we already have certain safeguards in Canada. In this country a sulfonamide can only be prescribed by a physician, and that should make it impossible for the layman to obtain it otherwise. Perhaps it is at this point however that the word of caution should be uttered. Every physician should be familiar with the fact that the sulfonamides may cause dizziness and ataxic movements resembling the effects of alcohol. In rare cases also there may be mental symptoms, such as depression, or elation or even hallucinations. For these reasons patients should not carry on their occupation while receiving these drugs.

The chance of serious accident under these circumstances is probably slight, but it exists, and there should be insistence on watchful precaution.

Men and Books

SOME WOMEN IN MEDICINE*

BY LAUDER BRUNTON

Montreal

The early story of women in medicine is shrouded in mystery. The only information available is hidden in manuscripts, and the controversies raging over the authenticity of some of the early characters will probably never be settled. The modern period, concerning which there is accurate information, has only recently begun. Medical education for women started in the United States, with a separate college for them, in 1850. The University of Paris opened its medical degree to women in 1868. Switzerland, a leader among the enlightened, opened all four of its medical schools to women in 1876, with no distinction.

When the Johns Hopkins School was opened in Baltimore, one of the conditions was that it should admit women. I would like to quote here from an article written by Osler for the *Century* magazine, February, 1891.

> "The question at issue is really one of principle, and eighteen months ago, when the Johns Hopkins Hospital was opened, it was then settled that in the opinion of the medical staff of the hospital, so far as ward work and clinics were concerned, there should be complete freedom. And this is right: if any woman feels that the medical profession is her vocation, no obstacles should be placed in the way of her obtaining the best possible education and every facility should be offered so that as a practitioner, she should have a fair start in the race. . . ."

The first class started out with sixteen students, three of them women. When Osler was asked the next year how the arrangement was working out, he said "A dismal failure; 33 1/3% of the women married the professor of anatomy". What really bothered him was, that at the end of the fourth year another 33 1/3% turned Christian Scientist just before the final examination!

The earliest of all medical women were, of course, midwives. From time immemorial childbirth has been considered a natural process, and as the function lies entirely with women, so very naturally should its conduct. However, the success of the midwife depended entirely on the naturalness of the process, and we find her calling upon the priest, witch doctor, or medical man, depending on the stage of society, in time of difficulty.

Obstetrical practice during the Renaissance was at an extremely low ebb. As a rule, only midwives attended women in labour, but this was not always the case, as is illustrated by a law passed in Germany in 1580, prohibiting shepherds and herdsmen from attending obstetric cases. Apparently, they were thought to have gained sufficient experience with their flocks. However, this was a rather brutal period, and it is only one hundred years later that we come to some of the most famous midwives of history.

France has undoubtedly produced more expert midwives than any other country, and has led the world with state schools for midwives. One of the best known women in France was Louise Bourgeois who first came to prominence in 1600, during the reign of Henry IV. At this time it had become the fashion for the courtiers to have men midwives for their mistresses. However, this did not satisfy the King, who had great faith in *la dame* Dupuis, since she had delivered his mistress *la belle* Gabrielle, safely, four times. When it came time for a midwife to be selected to attend the queen, Marie de Medici, the King was all for having *la dame* Dupuis, a very sound woman, in his opinion. However, the Queen felt that this was not altogether suitable, and herself chose Louise Bourgeois to attend her at her first confinement. All went well, and the infant was a boy who later became Louis XIII. Louise Bourgeois was established. Five children followed this one, and each time the Queen was attended by Louise. In one case, the child came into the world feet first, which caused some excitement, and a man midwife was held in reserve in the ante-room. (Here again we see the age-long custom of calling in a man when trouble arises). However the midwife conducted the case successfully, refusing assistance from the man and increased her reputation thereby.

Louise Bourgeois was the daughter of a middle class family and received a better education than most. Her family lived near Ambroise Paré and she was born at about the time that Paré's works were beginning to appear in print. Now there lived with Paré a certain barber surgeon called Martin Boursier, who came to know, and finally married Louise Bourgeois. After the birth of their first child, Louise became interested in obstetrics and decided to take up the profession of midwife. She received her training from her husband and Paré. The latter was probably the greatest living teacher, and published considerable material on the subject. She herself, in later life, wrote numerous works on obstetrics which were translated into other languages. Most of the material in these works came directly from Paré, but, unfortunately, she failed to give credit where it was due.

Two hundred years later we find some other famous midwives. Mme. Boivin, whose detailed descriptions were from first hand knowledge; Mme. La Chapelle, who wrote a book with statistical deductions from 40,000 cases. This book largely governed the management of labour

* Read before the third annual memorial meeting of the Osler Society of McGill University, March 27, 1942.

at that time; Mme. D'Arcanville introduced the use of bichloride of mercury as an antiseptic in 1766, a hundred years before the modern period of antisepsis.

In spite of the impressive array of good midwives, the science of obstetrics owes its existence to men, France coming to the fore again with Paré and Mauriceau. It is maintained by many, that men make the better midwives, being more sympathetic and gentle, and three centuries after the death of Bourgeois Elizabeth Blackwell complained of the rough treatment of patients, by midwives of the Maternity.

Hildegarde, of Bingen, often spoken of as St. Hildegarde, although never actually canonized, was a famous nun and abbess, who lived from 1098-1179, well known to history as a woman physician and a notable seer of visions. She left two books, mystic in character, dealing with these visions and their interpretation. Two further manuscripts treating with the vulgar details of medical information and anything but mystic, have been attributed to her, but are almost certainly not authentic and were probably written after her death. Hildegarde was an hysterical female and it is possible that her visions were on this basis. However, they all show remarkable similarity and depict the usual visual aura of migraine, that is, brilliant points on a bright background with wavy fortification lines.

About the year 1100, there lived, or is said to have lived, a woman called Trotula, a lady of Salerno, teacher, and author, being the progenitress of two works, a larger and a smaller, known as the Trotta and the Trotula. These works were for centuries standard and used by everybody studying medicine, along with the works of Galen. They were copied countless numbers of times and were extremely popular.

The University of Salerno was one of the most famous schools in the history of medicine. It claimed to be unique in that it admitted both women and Jews, and amongst these were the authors of medical works. In the history of Salerno written by Mazza he states that among all the ancient teachers the most important were women. Whether there ever was actually a woman by the name of Trotula has not been decided. The source of the two works mentioned is steeped in mystery. The champions of women point to the history of Mazza, mentioned above. However, it must be remembered that he was writing over five centuries later, and, a man may forget many things in five hundred years.

The champion of the other side of the argument is Singer. He points out that a man by the name of Trottus did live, and also that it was usual to use the feminine gender in speaking of a man's works. Thus the work of Rogerus was known as the Rogerena, and so also the works of Trottus as the Trotta and Trotula. These studies were largely gynæcological, that is, treating of the diseases of women. Singer suggests that since they deal with aspects of women's life and "contained something of the peeping Tom about them", the author, as a man, would be glad to "pass the buck", as the saying goes, and let it be thought that the source was a woman. Singer also says that "Good wife Trotula passed long ago into Dame Trot of the fairy tale and has been known in every nursery for 400 years." I cannot agree with this, as the word "Trot" is an old English colloquialism, meaning fussy old woman and there does not seem to be much connection between a medical teacher and the heroine of the rhyme.

Dame Trot and her cat
Sat down for to chat
The Dame sat on this side
And Puss sat on that. Etc.

I want to turn now to a short account of the life of one who although not furthering the cause of women in medicine, must be included amongst them. Dr. James Barry (her real name is not known), inspector-general of army hospitals, died in 1865, age unknown, holding the highest rank in the Army Medical Corps.

The early history of James Barry is shrouded in mystery. However, it is definitely known that she graduated from the Edinburgh School of Medicine in 1812 and thereupon joined the army. She rose rapidly in rank, becoming Surgeon-Major in 1827. In fact, her advancement was similar to that of the kangaroo, and on occasions she was promoted two steps at a time. She was noted for bravery and was present at the battle of Waterloo and later at Balaclava. As a surgeon she was dexterous and clever and her operating technique was described with admiration. Strangely enough, despite all this, Barry was never awarded a medal or honour of any sort. In the course of time she was sent to stations in various parts of the world: Jamaica, South Africa, Canada, and India. At one time she was Deputy Inspector-General for the Army Hospitals in Canada, and during this time lived in a house in Montreal at the corner of Durocher and Sherbrooke Streets. Dr. G. W. Campbell, at that time Dean of this faculty, attended her during an illness.

Barry was short in stature and of slight build, with a rather squeaky voice. This brought her in for a good deal of bantering from fellow officers. Unfortunately, she had a very nasty temper and resented the teasing of one of the officers so much that she challenged him to a duel and shot him through the lungs. Later Barry herself was wounded in another duel. This shortness of temper led to a number of disputes and she was apt to be insubordinate. More than once she was sent home under arrest to be court martialled, but it appears that she arrived back without having had any difficulties, and usually having been promoted.

During her last illness, she refused medical attention. Thus after death an inquest was held, and an autopsy proved that James Barry,

Inspector-General of Army Hospitals and ranking Medical Officer in the British Army, was a woman, not only a woman but the mother of at least one child. It has been suggested that the senior men at the war office knew her secret, for she was not treated as a man would have been. However, all her records have mysteriously disappeared, and no one knows the inside story of this amazing life.

The first woman to be admitted, as such, to a medical school in the United States was Dr. Elizabeth Blackwell. She decided to apply for entrance to a medical school in 1847 and tried the Philadelphia schools first, but was turned down by them all. She was advised to go to Paris, but someone told her that Paris was such a horrible place that she must give up all idea of going there. "A city of fearful immorality where every feeling will be outraged . . where vice is the natural atmosphere. . . ."

Finally, having given up hope in Philadelphia, she applied to twelve country schools in the Northern States, and got a letter from Geneva, New York, accepting her. There was also enclosed a resolution from the entire class of Geneva Medical College that she be admitted. It appears that the Faculty had intended to refuse her, and tried to pass the responsibility to the student body. This was later revealed by a member of the class. The Faculty told the students about her application and instructed them to vote on the question, but said that if there was one dissenting voice, she would not be admitted. It seems to have thought that the result was a foregone conclusion. However, it misjudged the student feeling. A meeting was held that night and the general consensus was that a co-ed would be a good joke. There was one dissenting voice but this was rapidly dealt with. The scene is described by a student. "A general rush was made for the corner of the room which emitted the voice and the recalcitrant member was only too glad to acknowledge his error, and record his vote in the affirmative." The Faculty was dismayed by the favourable feeling of the students, but was not able to take the responsibility of refusal upon themselves and therefore wrote to Miss Blackwell accepting her application.

A student describes the class as follows:

> "They were rude, boisterous and riotous beyond comparison. On several occasions the residents of the neighbourhood sent written protests to the faculty, threatening to have the college indicted as a nuisance if the disturbance did not cease. During lectures, it was often almost impossible to hear the professors, owing to the confusion. One morning, all unexpectedly, a lady entered the lecture room with the professor. Her entrance into that bedlam of confusion acted like magic upon every student. Each hurriedly sought his seat, and the most absolute silence prevailed. For the first time a lecture was given without the slightest interruption, and every word could be heard. The sudden transformation of this class from a band of lawless desperadoes to gentlemen, by the mere presence of a lady, proved to be permanent in its effects."

She got on exceedingly well, and when the class became somewhat boisterous, as it apparently did occasionally, due to the fact that a Normal School for young ladies, was overlooked by the classroom window, she studied her notes carefully. She finally graduated at the head of her class and went to England. During her stay, she was shown great deference; but whenever she went among students, she was stared at as a curiosity.

In 1849 she went to Paris, following the advice of all her teachers and medical friends. She was told to enter the Maternité, and did so, despite the fact that she was practically imprisoned there and had to perform menial tasks. She also complained of loss of sleep, familiar to those who have worked in a maternity hospital. At this time, no other hospitals, dispensaries, or clinics were open to women.

La Maternité is a very large state institution, one of the oldest and most famous of the Paris hospitals, handling about three thousand deliveries a year, and women come from all over France to be trained as midwives. Dr. Blackwell was admitted as a student and was given no privileges whatsoever, living and studying with the ignorant country girls. However, the work was all new to her, which shows how meagre was her training at medical school. The student midwives were never allowed to leave the building, and no newspapers or printed matter of any kind except textbooks were allowed in the building.

She makes one very interesting reference to Claude Bernard, which is well worth quoting. "Today M. Blot spoke of a friend Claude Bernard, a distinguished young inquirer, who is now, he thinks, on the eve of a discovery that will immortalize him, *viz.*, the discovery of an accessory circulation, by which substances are sent directly to the kidneys without traversing the general circulation, which will explain for instance the rapid effect of champagne on the kidneys. This second heart is situated in the ascending vena cava, close by the liver. . . ."

Dr. Blackwell decided to stay only six months, as she desired to study surgery. In fact she wanted to be the "first lady surgeon in the world". Unfortunately, near the end of her stay she got purulent ophthalmia while syringing out the infected eye of a baby. The loss of sight in one eye forced her to give up the idea of surgery. In 1850 she was admitted as a student to St. Bartholomew's where she was allowed to work in all the wards, except that for female diseases. At this time she attended Mr. Paget's lectures on pathological anatomy, those same lectures that Henry Jacob Bigelow travelled all the way from Paris to London every week to hear!

This same year she returned to the United States and set up practice in New York. The first seven years were difficult uphill work, the profession stood aloof and the public distrusted

a woman doctor. Her application for a position in the women's department of a city dispensary was refused, and so in 1853 she finally started a clinic of her own. It was her sister who was to get the surgical experience that Elizabeth Blackwell had coveted so much, and in 1854 Emily Blackwell was taken on as assistant by Sir James Simpson.

In 1858, ten years after she had started medicine, Elizabeth Blackwell returned to England to continue the struggle to obtain medical education for women, and a year later she was registered as a physician by the Medical Council of England on the strength of her American degree. And so we leave this courageous woman, the first medical student in the United States, and the first woman physician to be registered in England.

However it was almost 30 years later, in 1873, that Lucy Wanzer applied for admission to Toland Hall Medical School in San Francisco. She was told that a medical school was no proper place for a woman and she was advised to go east to some woman's college in Boston or Philadelphia. But she was determined, and so the matter was put before the board of regents, who with their attorneys were forced to wrestle with the problem. Finally, they came to the conclusion that "it is an organic law of the state that the male and female shall have equal choice in the University in all its departments." Lucy Wanzer handed this decision to Dr. Toland and paid her fees. The Dean announced to the students that a woman would attend classes. He advised them to haze her. "We have to accept this woman student, as she has the best of us. The law has decided in her favour, but you can make it so uncomfortable that she cannot stay. We will get rid of her in short order." Such was the Dean's conception of equal chances for men and women. But Lucy Wanzer "stuck it", and, needless to say, it was not very long before she became well liked by the students who helped her in every way. She was the first woman doctor to graduate in the State of California. However, during the course of her studies, she had to face almost continuously the dislike and hard words of her teachers.

Elizabeth Garrett was born in England in 1836. She became the great champion for medical education for women in that country, and the first English woman doctor. She started training as a nurse in the Middlesex Hospital. This period of nursing was a sort of probationary one, to see if she was sufficiently interested to go ahead with medicine. Her position was a peculiar one, not that of a nurse in training and not that of a student, but a mixture of the two. At this time she was not at all sure that the medical board would accept her as a student. This was the year 1860 and no woman had ever been admitted as a student to an English medical school. Although Elizabeth Blackwell had studied at "Bart's" in 1851 she was accepted there on the strength of her medical degree and not as an undergraduate.

During the next year (1861) Elizabeth Garrett was privately tutored by two doctors and had the use of a room in the hospital where she could dissect. When this room was taken away, she hoped to be allowed into the students' dissecting room, as the alternative would have been taking bits to her bedroom to dissect. Fortunately, all went well and she was allowed the use of the dissecting room and was also admitted to lectures in chemistry. At this time she writes "I go round with Dr. Thompson now. He is a Fellow of St. John's, Cambridge, and an examiner at the College of Physicians, it is very difficult to catch what he is talking about. However, he is very civil, and knowledge is a secondary thing till I have broken down the opposition of those who will have the power of keeping me out of the School. I feel so mean in trying to come over the doctors by all kinds of little feminine dodges."

Whether lawful or not, she apparently used her arts, and doctors are just as susceptible as others. In this same year she was accepted for some special courses of lectures and demonstrations and she paid fees, but was not allowed to enter as a regular student. She says "I have had to sign my name in the College books in token that I will not smoke but will in every way comport myself as a gentleman."

Unfortunately, as time went on, she found the staff growing less sympathetic. At examinations she did so well that the examiner asked her to keep her results a secret. The final blow came when the visiting physician asked the class a question which none of the men could answer, but which she answered correctly. The students were angry and petitioned for her dismissal. A counter petition was sent, but she was told that she would be admitted to no more lectures after the period covered by fees already paid.

After leaving the Middlesex Hospital she spent four years vainly attempting to gain entrance to the different medical schools, being refused in each case.

The whole question hinged on women being permitted to sit for examinations. None of the examining bodies would accept women, and all the medical schools used this as their excuse for refusing them. Finally, it was found that the regulations of the Apothecaries Hall did not permit the exclusion of women from examinations. There were only two regulations to be fulfilled, the first to be apprenticed to a medical man for five years before final examination, and, the second, to spend three years in a Medical School in the United Kingdom. It was this second clause which appeared almost impossible to attain. Having been turned down by all the English schools, she tried St. Andrews. After a good deal of excitement and some glimmer of hope, she was finally turned down there. She

was even refused private tuition in anatomy. Finally she was able to get permission to work in the London Hospital under the same conditions that had obtained at the Middlesex. She was continually struggling against prejudice. The teachers were her greatest difficulty. Throughout her checkered career it appears that students were quite sympathetic.

After six months she was expelled from the London Hospital for no apparent reason. Finally, she obtained the necessary certificates to sit for the examination of the Society of Apothecaries. There was some heckling here, and the Society attempted to back down from their promise of four years before. However, the threat of legal pressure caused them to capitulate. Elizabeth Garrett was finally able to set up practice as a Licentiate of the Society of Apothecaries. This was in the autumn of 1865.

In 1866 the University of Paris opened its medical degree to women and Elizabeth Garrett decided to take advantage of this to obtain a doctor's degree. She was successful and obtained exemption from the necessity of living as a student in Paris. She even received a friendly message from the Emperor, Napoleon III. All of which goes to show how much wiser and more broad-minded were the French. By this time there were six women studying medicine at Edinburgh, led by Sophia Jex-Blake, and these sent her a testimonial on her graduation.

The worst of her tribulations were over now. In 1870, the Education Act was passed, setting up the system of school boards which is still in force. Elizabeth Garrett was persuaded to stand for election and was elected with four times as many votes as the next candidate on the list, Professor T. H. Huxley.

She was married in 1871 to James Anderson, a shipowner. Her marriage made no difference to her career either as a public figure or as a practitioner of medicine. In 1874 the London School of Medicine for Women was opened, due to the courage and perseverance of Miss Jex-Blake, and Mrs. Anderson joined the staff. Ten years later she became dean of the first medical school for women.

The early history and vicissitudes of this school are very fascinating. At first, no hospital would accept its students for clinical teaching and no medical board would accept them for examination. But within three years, it had both clinical teaching and examinations, the latter made possible by a special act of parliament.

The Royal Free Hospital undertook the clinical teaching for an annual sum of £715, part of which was guaranteed by Mrs. Anderson. Finally, in 1883, Mr. Garrett was able to come up to London to see his daughter, as Dean of the Medical School for Women, present the first ladies who earned the medical degree of the University of London.

In 1878 Mrs. Anderson performed an oöphorectomy, and she is considered to be the first woman ever to do this operation, at least successfully. When she died in 1917, the name of the hospital was changed to the "Elizabeth Garrett Anderson Hospital".

It is impossible, in the available time, to trace the career of Elizabeth Garrett further, but there is no question that she did more for the cause of women in medicine in England than any other person. Miss Jex-Blake was of a more fiery nature and frequently got herself into hot water. In fact she was the type of person of whom it has been said, "They are quite capable of first heating the water and then getting in to it." The more balanced outlook and quieter perseverance of Elizabeth Garrett went very much farther in advancing the cause of women.

Although Christine Murrell was not born until 1874, the year that the London School of Medicine for Women was opened, and thus was not in at the "find", she was still one of the pioneers among women in the medical field. As her biographer has said, "The task of her forerunners was to establish the right of women to enter the profession. There remained the harder task of proving that they could be of value to it. It was this task which Christine Murrell accomplished with paramount success."

Her greatest contribution was in the field of public service. Although she kept up a large practice at the same time, she lectured unendingly, most often to working girls and mothers. First aid, home nursing, and care of infants were her most frequent topics.

In those days it was maintained by men and accepted by the women that the female was not as healthy as the male. Christine Murrell did much to dispel this fallacy and teach women something about themselves. She was, above all, interested in public health and preventive medicine and was largely responsible for starting what we know today as well-baby clinics. In fact her clinics were run exactly as are the most up-to-date ones today.

She took part wholeheartedly in the Women's Suffrage movement, but necessarily only in capacities where she would not be liable to arrest. It was a common thing at that time for suffragettes who had been arrested and put in jail for violence to go on hunger strikes. When these women were near death from starvation they were released and Christine Murrell looked after a great many of them in her own home. It seemed almost futile, for as soon as she had got them back to health, they were bounced back to jail to be forcibly fed.

I cannot conclude this paper without mentioning Dr. Maude Abbott; although there is little that I can add concerning a person so well known to many of you. She was the most outstanding woman that Canada has contributed to the fields of medicine. The best illustration of the temper of her work is to quote a letter

from Osler. He had asked her to write the chapter on congenital heart disease for his system, and he wrote thus: "I knew you would write a good article, but I did not expect one of such extraordinary merit. It is by far and away the best thing ever written on the subject in English, possibly in any language. . . . For years it will be the standard work on the subject. . . ."

What more could be added to such praise from such a man? Undoubtedly, hers will remain one of the very great names in the history of women in medicine.

CATECHISM IN MEDICAL HISTORY

BY HEBER C. JAMIESON

Edmonton

QUESTIONS

1. A person may have gonorrhœa and gonitis. One may have gonitis without gonorrhœa. Explain.
2. Why was the carotid artery so named?
3. What early Greek physician is said to have received over one hundred thousand dollars as a fee for the treatment of one patient?
4. What is urina cibi, urina potus, urina sanguinis?
5. What are the four greatest advances in the diagnosis of tuberculosis since Hippocrates?
6. "Painless childbirth is sacrilegious". "Painless childbirth is unnatural". "It is dangerous. It is immoral". What was the occasion for these statements? What royal personage put a quietus to the storm of protest?
7. Why were many early hospitals of France, England and Canada called "Hôtel-Dieu"?

ANSWERS

1. Gonorrhœa means the running of semen. Gonitis is inflammation of the knee joint.
2. Compression of the carotid artery was supposed to cause stupor. (Karotikos—sleepy; Karoun—to stupefy).
3. Erasistratos (295 B.C.). Sometimes called the father of physiology. Said to have received this generous fee for healing the son of the King of Syria.
4. Mediæval physicians spoke of urina cibi as the urine of food; urina potus as the urine of drinking, and urina sanguinis as the urine after sleep.
5. Percussion of Auenbrugger, stethoscopy of Laennec, the bacteriology of Koch, and the x-ray of Roentgen.
6. When Sir James Y. Simpson used chloroform for labour, the clergy, laity and even prominent physicians cried out against its use. Queen Victoria in 1853 accepted chloroform for the delivery of her seventh child and objection ceased.
7. Early hospitals were constructed for the care of the old, feeble, and infirm but they were founded by the church and the care of the soul was of paramount importance, the cure of the body incidental.

Medical War Relief Fund

[We have received the following from the Treasurer of the Medical War Relief Fund.]

Dr. D. Sclater Lewis,
Honorary Treasurer,
Canadian Medical Association

Dear Dr. Sclater Lewis,

The Committee of the Medical War Relief Fund, at its meeting last week, had before it the annual financial statement. The Committee expressed deep appreciation of the very generous help received from our colleagues in Canada through the Canadian Medical Association, and a special reference to this will appear in a further report on the work of the Fund approved by the Committee for publication in the medical press.

Yours sincerely,
G. C. ANDERSON.

November 23, 1942.

The following additional subscriptions have been received:—

Individual subscriptions from Saskatchewan...	$40.00
Tisdale Clinic, Tisdale, Saskatchewan.....	50.00

University Notes

The Expansion of the McGill Medical Journal

For some time it has been felt that the *McGill Medical Journal* could fulfil a more definite function in the University. Of recent years the trend of policy has been to introduce contributions from the staff, and this has been accomplished by increasing the size of the Journal rather than by decreasing the number of student articles. This has had such a good effect on the quality of the student contributions and on the value of the Journal itself that changes have been proposed. In order to give more effect to this policy two graduate members of the teaching staff have been admitted to the Editorial Board of the Journal. These act largely in an advisory capacity to give increased scope in the editorial criticism of articles. The students retain full control of the management of the Journal.

These changes are designed not only to increase the quality of the Journal but to act as a cohesive influence between the diverse departments and hospitals of the medical school. In these times of accelerated courses and increased pressure of work, it is felt that the Journal can play a definite educative part for the students, for the interns, and for the many McGill men and others who make up the Montreal medical community.

The General Secretary's Page

Happy New Year! Especially to our colleagues in the armed forces I would like to say that wherever you are, and whatever may be your lot this coming year, we at home wish you good health and an early and victorious homecoming.

It is common knowledge that the Federal Department of Health has been devoting much time during the past year to the study of Health Insurance and to the drafting of legislation for submission to Parliament. It is difficult to predict when such legislation might appear in the House of Commons, realizing that the mental and financial implications of war tend to push aside consideration of social legislation, especially of a type which would entail the outlay of large sums of money for its implementation. But the picture would seem to have changed somewhat suddenly with the publication of the Beveridge Report in Britain. It may be argued that, if the Motherland, gripped in war, can take time out (and money, too) to lay social security foundations now for the days of peace, our own Government may feel disposed to push on with the consideration of health insurance legislation at a much earlier date than would have seemed likely a few weeks ago.

If a Bill or Bills of Health Insurance should be introduced into the coming session of Parliament, the Canadian Medical Association fortunately will not be found unprepared to make its voice heard. It is to be regretted, however, that more than 25% of our profession who are now engaged in His Majesty's Service would not have the same opportunity to consider the legislation as would those of us who remain at home;—and, moreover, the majority of the enlisted doctors are of the younger age group who have much at stake in any health insurance plans under which they may have to practise upon their return to civil life.

May we say, however, to the medical profession of Canada, both within and without the Armed Services,—that if called upon to do so the Canadian Medical Association will endeavour to the best of its ability to interpret your views to Parliament.

If Health Insurance is to find a place in Canadian legislation, either federal or provincial, or both, then it must be of a character which leaves nothing to be desired in adequate health protection of the insured population; and, moreover, the Canadian people must be prepared to pay for it.

When addressing the Canadian Medical Procurement and Assignment Board at its inauguration on July 7, 1942, the Honourable J. L. Ralston, Minister of National Defence (Army), had this to say:

"This Board is a cross section of Canadian Medicine, military and civilian. Canadian medicine must be 'all out' in Canada's 'all out war'. Military service and the civilian needs are not competitive but complementary. We must not attempt to press priority of one over the other. It must be remembered, however, that it is easier to adjust civilian practice than military practice. We must be prepared to improvise, to adapt, to plan, to rack our brains in order that the complete mobilization of Canadian medical manpower and womanpower be used to the best possible advantage in this life and death struggle.

Your paramount job is to aid the fighting forces but you must never forget and must always realize that the fighting forces cannot get along without the nation behind them. It will be your duty as a Board, and of the Advisory Committees throughout the country associated with you, to have due regard to the civilian medical needs in addition to the needs of the armed forces.

All national efforts are and must be ancillary to the successful termination of this war in order that a permanent peace may be secured by a decisive victory."

The terms of reference to the Board could not have been more clearly stated than in the words of the Honourable Minister.

The Board was immediately charged with the responsibility of assisting in securing 800 doctors for the armed services within a period of nine months. To date more than 600 of this number have enlisted, but with the needs having been revised upwards, 400 medical enlistments will be required in the next three months.

As the work of the Board progressed, it became apparent that to keep a balance between military and civilian needs, as so well expressed by the Honourable Mr. Ralston, required a national inventory of our health services. So the terms of reference to the Board have been enlarged by two recent Orders-in-Council providing for a complete national stock taking and survey of doctors, dentists, nurses, hospitals, public health departments, medical schools, medical research, war industries and civilian medical requirements.

All of the professional groups concerned have been consulted and have wholeheartedly agreed to participate in the study. The Divisional Advisory Committees are to be assisted by twelve full-time medical field secretaries who have been loaned for the purpose by the Medical Services of the Navy, Army and Air Force.

Never before has Canada embarked upon such a complete and comprehensive inventory of its health workers and assets as is contemplated in this survey. It is anticipated that the study will be completed in three to six months' time, and that recommendations will be forthcoming which will assist greatly in determining how best our health services and resources may be utilized in Canada's all-out war effort.

Medical Societies

The Canadian Physiological Society

The eighth annual meeting of the Canadian Physiological Society was to have been held at the University of Western Ontario, London, Ontario, on October 23 and 24, 1942. After announcement of the meeting, it became evident that attendance was likely to be very poor. Accordingly the Council thought it wise to postpone the meeting indefinitely.

The following are abstracts of the papers that had been submitted for presentation.

THE RELATIVE ANTIRACHITIC ACTIVITIES OF VITAMIN D_2 PALMITATE AND FREE VITAMIN D_2.—Basil E. Bailey, from the Fisheries Research Board of Canada, Vancouver, B.C.

It had previously been observed that various fish oils yield upon saponification a vitamin D with considerably higher antirachitic activity than that of the naturally occurring vitamin in the oil. Since at least part of the vitamin D in such oils occurs in the form of fatty acid esters, it appeared that the increased activity after saponification was probably due to a difference in activity between the esterified and the free vitamin D.

In order to obtain further evidence bearing on this phenomenon some vitamin D_2 palmitate was synthesized from calciferol and palmityl chloride, and a portion of this synthetic ester saponified, the relative antirachitic activities of the ester and its hydrolysis product being determined. Neither the synthetic vitamin D_2 palmitate nor its hydrolysis product were isolated in the pure form. They were fed to the animals in amounts based on aliquots of an ether solution of the ester.

When thus tested with rats the vitamin D palmitate proved considerably less active than its hydrolysis product, the latter having two and a half times the antirachitic activity of the former.

RECHERCHES SUR LA CICATRISATION DES PLAIES. 1. ACTION DE L'ACIDE OXALIQUE, DES OXALATES, ET DE SUBSTANCES PRÉCIPITANT LE CALCIUM SUR LA CICATRISATION DES PLAIES. — Louis-Paul Dugal et Henri Laugier, from the Université de Montréal.

Nous avons soumis à l'expérimentation l'hypothèse d'après laquelle les substances précipitant le calcium seraient accélératrices de la cicatrisation. Nous avons choisi les substances chimiques suivantes: acide oxalique, oxalate de sodium, oxalate de potassium, fluorure de sodium, toutes capables de précipiter le calcium. Tous les résultats mentionnés dans ce travail proviennent toujours de la comparaison de deux plaies sensiblement égales d'un même lapin, traitées de façon différente: ceci élimine le facteur individuel. Des expériences préliminaires ont montré, de façon nette, que ces substances permettent une cicatrisation beaucoup plus rapide que celle obtenue par la chloramine-T.

Une étude des concentrations les plus favorables de chacune des substances mentionnées nous a appris que ce sont les concentrations les plus faibles (de celles employées) qui sont les meilleures (soit oxalate de sodium 0.01 N, oxalate de potassium 0.01 N, acide oxalique 2%, fluorure de sodium 0.01 N).

Nous avons comparé l'effet de l'acide oxalique 2% à l'action de l'eau salée 8%, cette concentration d'eau salée nous ayant été révélée experimentalement comme étant la plus favorable à une cicatrisation rapide.

Les résultats de cette comparaison sont les suivants: 19 expériences sur 23 ont prouvé une accélération nette de l'acide oxalique par rapport à l'eau salée; les gains effectués par les plaies traitées à l'acide oxalique sont en moyenne de 22% (maximum 42.0%).

L'acide oxalique a une action accélérante pendant toute la durée de la cicatrisation.

THE DISINTEGRATION AND REGENERATION OF THE SURFACE EPITHELIUM OF THE GASTRIC MUCOSA AFTER MILD IRRITATION.—Rhoda Grant, from the Physiology Department, McGill University, Montreal.

The alkaline opaque "mucus" which is produced after 1% acetic acid or 50% alcohol have been in contact with the mucosa for one-half hour or five minutes, respectively, is packed with mucus-secreting cells; these do not appear spent or dead as the term "desquamated" suggests, but rather as if they had been shed while actively secreting. If the "mucus" has been made acid in reaction ("*in vivo*" or "*in vitro*") the cell bodies show different degrees of disintegration; sometimes only the nuclei remain. Also under these conditions minute bubbles appearing in the mucus mass indicate liberation of a gas; the accompanying chemical changes may be associated with the production of the intrinsic factor or with other unsolved mysteries still bound up with the gastric mucosa. The results are also of interest in connection with the theory of Wright *et al* (1940) concerning the production of endo-enzymes in the duodenum and small intestine.

In serial sections, for which we are indebted to Dr. Selye, who kindly had them made for us, we observed that within an hour or two after the shedding of the mucus-secreting cells, low, flat cells were spreading over the denuded surface from the edges of the gastric pits. The rapidity with which the first stages of the repair process appear to set in may not be inconsistent with the ease with which these cells are lost from the surface and with the physiological functions which they perform.

THE ALLEGED ANDROMIMETIC ACTIVITY OF THE X-ZONE OF THE ADRENAL GLAND OF THE MOUSE. — M. K. McPhail, from the Department of Pharmacology, Dalhousie University, Halifax.

Data have been accumulated which indicate that the X-Zone is not a site of male hormone production in the mouse. This view has been obtained as a result of the gross and histological examination of accessory sex organs removed from mice of 5 separate experimental groups, the animals being prepared as follows: Group 1. Castrated only. Group 2. Castrated and adrenalectomized. Group 3. Castrated and autotransplanted with adrenal gland capsules. Group 4. Castrated and adrenal glands enucleated (capsule and small amount of cortex left intact). Group 5. Castrated and adrenalectomized, followed by repeated intramuscular implantation of (i) decapsulated X-Zone bearing adrenals, (ii) decapsulated non-X-Zone bearing adrenals.

From none of these experiments has any evidence been obtained that x-zone tissue as such either stimulates or maintains the growth of the prostate and seminal vesicles in the castrated mouse.

MUSCULAR RESPONSES RESULTING FROM ESERINE AND ACETYLCHOLINE ON THE CEREBELLAR CORTEX.—Frederick R. Miller, from the Department of Physiology, University of Western Ontario, London, Ontario.

Local application of eserine 1:100 and of acetylcholine (ACh.) 1:2,000 to 1:100 to the cortex of the lobus anterior of the cerebellum of the decerebrate cat yield tonus changes: these consist of flexion or extension of fore- and hindlegs, followed by phasic changes. Similar responses are yielded under dial by the application of eserine and ACh. to the lobulus simplex and folia cacuminis. The above effects are abolished by complete atropinization. The responses are regarded as signs of stimulation of the cerebellar cortex by eserine and ACh.; it is suggested that the drugs stimulate the synapses of the climbing fibres around the dendrites of the Purkinje cells. The pathways are through the nucleus fastigii, fastigiobulbar tracts, and vestibulospinal tracts.

THROMBOCYTOPEN: A PRELIMINARY REPORT DESCRIBING A CRYSTALLINE SUBSTANCE ISOLATED FROM BEEF SPLEENS.—H. G. Skinner, from the Department of Pharmacology, University of Western Ontario, London, Ontario.

A crystalline substance was isolated from beef spleens by extracting with a water acetone solution. The proteins were precipitated with lead acetate and heat. The filtrate was treated with hydrogen sulphide and refiltered. The resulting solution was treated with silver nitrate, which precipitated the thrombocytopen. The precipitate was suspended in water and treated with hydrogen sulphide. The silver was precipitated releasing the thrombocytopen which was crystallized from the filtrate by evaporation. The crystals are white and usually rectangular. The substance is soluble in water, insoluble in acetone, ether, petroleum ether, and chloroform. On ashing, a very small amount of residue remained that gave a positive test for phosphorus. Thrombocytopen dialyzed through cellophane and was stable to heat at 115° C. for six hours in a sealed tube. The substance melted at 165° C.

On intravenous injection into twenty-five (25) rabbits and one dog, thrombocytopen lowered the platelets to a point as low as 10% of normal. This reduction depended on the dose, although the rate of lowering is apparently independent of the dose within certain limits. The capillary fragility was not affected by thrombocytopen in rabbits, guinea pigs and a dog.

SOME ASPECTS OF GASTRIC SECRETION INDUCED BY MECHOLYL.—G. W. STAVRAKY, from the Department of Physiology, University of Western Ontario, London, Ontario.

When the stomach is divided into a pyloric and a fundal pouch mecholyl causes a secretion of alkaline mucus from the pyloric portion of the stomach simultaneously with the secretion of acid and pepsin from the fundal pouch. From the whole stomach, fractionated injections of mecholyl cause an abundant secretion of fluid and acid, whereas single doses of mecholyl cause a scanty secretion of gastric juice of low acidity. The concentration of pepsin in the gastric juice is high as long as the juice is acid in reaction, and is independent of the volume of secretion or mode of administration of mecholyl, but is related to the amount of mecholyl given. Preceding administrations of mecholyl also raise the concentration of pepsin in the gastric juice evoked by stimulation of the vagi nerves.

THE RÔLE OF HÆMORRHAGE IN SECONDARY SURGICAL AND TRAUMATIC SHOCK.—Paul G. Weil,* from the McGill University Clinic, Royal Victoria Hospital, Montreal.

The importance of hæmorrhage in the development of secondary surgical and traumatic shock (exclusive of burns) has long been recognized, but the theory that shock is due to the absorption of toxic substances from traumatized tissues has shared equal if not greater consideration. An investigation of over 50 cases of secondary surgical and traumatic shock has been carried out. Hæmoglobin determinations were performed before operation in many cases of the former group and in most cases of both groups immediately after and at intervals of 24, 48 and 72 hours after shock. A progressive increase in hæmodilution during the 72 hour period after recovery from shock was an invariable finding. As a result of these studies and other evidence, it is apparent that hæmorrhage is the initiating cause of secondary surgical and traumatic shock and that there is no generalized or appreciable local loss of plasma with consequent hæmoconcentration in these forms of shock.

* Aided by a grant from the National Research Council, Ottawa, Canada.

The significance of these findings in the experimental and clinical investigation of shock is discussed.

CHANGES IN THE pH OF THE BLOOD.—R. A. Waud, M.D., Ph.D. and Wm. Bending (by invitation), from the Department of Pharmacology, University of Western Ontario, London, Ontario.

Dogs were anæsthetized with nembutal and ether, the carotid artery and the external jugular vein exposed. After rendering the animals' blood incoagulable, a flow type glass electrode was connected into the animals' circulation and pH determinations of the blood were made at will with the Beckman pH meter. Following "normals" the effects of asphyxia, administration of carbon dioxide and ether and variations in respiration were studied. Asphyxia caused various degrees of lowering of the pH. The administration of ether lowered the pH, as did also carbon dioxide in proportion to the percentage inhaled. The pH followed very closely the changes in respiratory volume as recorded with the recording spirometer. Various other effects were studied.

PYRIDOXINE AND PROTEIN METABOLISM II. THE SYNTHESIS OF GLYCOGEN FROM PROTEIN.—Madeleine S. Cornett and E. W. McHenry, from the School of Hygiene, University of Toronto.

In a report previously published from this laboratory is was shown that pyridoxine and thiamin must be supplied to rats to enable them to synthesize fat from protein. A continuation of this investigation has shown that rats are unable to synthesize glycogen from protein unless the same two vitamins are available. Similar results were secured in fasted rats which were given alanine. These data are regarded as further evidence regarding the relationship of pyridoxine to amino acid metabolism.

List of other papers read but not abstracted were:

THE POTENTIATION OF INSULIN BY SULFONES.—A. Bruce Macallum and Christian Sivertz, from the Departments of Biochemistry and Chemistry, University of Western Ontario (to be published shortly).

OBSERVATIONS ON A MICROBIOLOGICAL ASSAY FOR RIBOFLAVIN IN BLOOD.—D. M. Young and E. W. McHenry, School of Hygiene, University of Toronto.

AN ALCOHOL DEHYDROGENASE IN BRAIN.—J. G. Dewan, Department of Biochemistry, University of Western Ontario, London, Ontario.

La société médicale des hôpitaux universitaires de Québec

Une séance de cette Société à l'hôpital du St-Sacrement, Que., a eut lieu, le 6 novembre 1942. Suivent les résumés des travaux présentés a cette occasion.

COLITE GRAVE A SCHIGELLA ALKALESCENS (ANDREWS). — J. Edouard Morin et Antonio Martel.

Les auteurs rapportent l'observation d'une fille de 19 ans qui, du mois de mai 1940 au mois de février 1942, a présenté un syndrome dysentérique dont la gravité devint si inquiétante, en novembre, que ses parents, cultivateurs, jugèrent nécessaire l'hospitalisation (25 novembre 1941).

A ce moment, la malade évacue 5 à 6 selles abondantes, liquides, sanguinolentes et purulentes. Les urines sont rares, avec albumine, pus et globules rouges. La malade est très pâle, intoxiquée bien que la formule sanguine n'a rien d'alarmant. La rectoscopie indique une muqueuse rouge tuméfiée, avec muco-pus et sang en abondance. L'examen bactériologique des selles a donné un bacille gram négatif identifié comme étant un *Schigella Alkalescens* (Andrew)s

Avant l'identification de ce bacille dysentérique, la malade a reçu sans succès, les médications les plus variées, sulfaguanidine, les opiacés, le bismuth, des vitamines A, etc. divers sérums anti-dysentériques. Le Rouge Congo (Hémorragyl Nadeau) amena la cessation des hémorragies. Entre-temps survint une phlébite, on pratiqua un auto-vaccin qui fut administré simultanément en ingestion et en injection sous-cutanées. Après deux semaines de vaccino-thérapie, la température redevient normale et les troubles intestinaux s'amendent de jours en jours; en effet, la malade n'a plus qu'une ou deux évacuations alvines par jour, le pus et le sang disparaissent.

A ce moment, l'anémie était assez intense: globules rouges 1,760,000, globules blancs 7,000, hémoglobine 30%. Après trois semaines d'amélioration, le 3 février, la formule sanguine est la suivante: globules rouges, 3,280,000, globules blancs: 6,250, hémoglobine 64%. Un lavement baryté montre un aspect tacheté, tigré de la muqueuse intestinale qui rappelle la polypose gastrique.

Les examens bactériologiques ont été le sujet de longues recherches. La souche *Schigella Alkalescens* (Souche Crispo) a été agglutinée à un très haut degré par un sérum expérimental (Professeur Murray, McGill).

Cette observation est intéressante du fait des symptômes graves et prolongés de l'affection. De la pathogénéité de cette souche *Schigella Alkalescens*. De l'origine hydrique de l'infection, car on a réussi à isoler le même microbe de la source où s'abreuve la famille pendant qu'elle travaille sur la terre.

L'auto-vaccino-thérapie a-t-elle été réellement l'élément thérapeutique qui a guéri la malade? . . .

La petite malade a été revue en octobre, et sa santé est excellente. Elle a engraissé de 28 livres et sa formule sanguine est redevenue normale.

HYSTÉRO-TRAUMATISME. — Renaud Lemieux et Honoré Nadeau.

Les auteurs rapportent l'observation d'un cas type d'hystéro-traumatisme. Il s'agit d'un sujet âgé de 36 ans, cuisinier de son métier, qui, après avoir été exposé, sans aucune blessure, aux dangers d'un bombardement aérien, a développé un syndrome neuro-musculaire caractérisé par un tremblement continu des membres supérieurs et inférieurs gauches, de l'hémi-face gauche et de la langue. Ce tremblement s'accompagne d'une parésie et d'une hypo-esthésie gauches, respectant la totalité de la paroi abdominale. Les troubles nerveux sont apparus trois jours après qu'il eut été exposé aux dangers du bombardement. Ils se sont accentués progressivement.

L'examen neurologique ne permet de mettre en évidence aucun signe qui puisse être la traduction de lésions organiques du système nerveux. L'épreuve du traitement purement psychothérapique amène une amélioration notable de tous les symptômes.

Cette observation parait intéressante du fait que de tels cas sons susceptibles de devenir plus nombreux à l'avenir par suite des multiples traumatismes dont est fertile l'époque troublée que nous traversons présentement. Il sera donc indispensable au clinicien d'être en mesure de faire le départage entre les syndromes nerveux organiques et les accidents qui relèvent purement de la psychose.

LA LYMPHOGRANULOMATOSE MALIGNE CHEZ L'ENFANT.—Marcel Langlois.

Une observation de lymphogranulomatose maligne chez un enfant de 6 ans est rapportée, et est comparée aux descriptions cliniques de la maladie à cet âge. Les conclusions inscrites ici sont celles de l'auteur.

La rareté relative de la lymphogranulomatose maligne chez l'enfant nous a incité à signaler cette observation. Les caractères particuliers de l'adénopathie associée à une splénomégalie précoce permettent de soupçonner le diagnostic. Et il faut retenir cette succession de poussées évolutives nettement appréciables suivies de rémissions non moins nettes, comme étant quasi pathognomonique.

La formule sanguine est très variable, non seulement d'un malade à un autre, mais même en cours d'évolution chez un même sujet. La leucopénie progressive du début chez notre malade contribua à nous faire hésiter, vu l'absence d'augmentation de la polynucléose neutrophile considérée par bien des auteurs comme constante. Cette dernière ne s'est révélée qu'au cinquième examen de sang le 6 septembre 1942.

Le diagnostic qui ne s'affirme que sur la biopsie d'un ganglion est plus difficile au début dans les formes mésentériques.

L'association fréquente, à cet âge, de la tuberculose à la lymphogranulomatose maligne est considérée par la plupart des auteurs comme une coincidence. L'anergie qu'entraine celle-ci peut permettre une localisation terminale de celle-là. Cette association a été mise en évidence chez notre malade.

ABCÈS DU LARYNX.—Olivier Frenette et Jules Hallé.

L'action des sulfamidés peut s'avérer particulièrement énergique dans le traitement de l'abcès laryngé. Grâce à cette médication, il est possible d'éviter une trachéotomie, en suspendant l'évolution du processus envahissant qui menace généralement de déclencher de l'asphyxie à brève échéance. L'intervention chirurgicale pourrait être pratiquée sans laryngoscope dans des conditions faciles, alors que l'abcès aura eu le temps de se bien limiter chez un malade en état de défense optima et dont la guérison surviendra dans un laps de temps plutôt court.

Les auteurs citent ensuite le cas d'un malade hospitalisé récemment à l'hôpital du St-Sacrement pour une phlegmasie diffuse endolaryngée, qui fut placé pendant deux jours dans une chambre bien ventillée et saturée d'humidité et qui reçut, goutte-à-goutte, et par voie intra-veineuse, chaque jour, 1,000 centimètres cubes de sérum physiologique additionné de deux ampoules de 1 gm 20 de solu-septazine. Trente-six heures après son entrée à l'hôpital l'examen endoscopique permettait de constater qu'une collection purulente, du volume d'un jaune d'œuf, s'était constituée à la base de l'épiglotte. L'infiltration avait disparu et le malade se sentait beaucoup mieux. L'ouverture de l'abcès fut alors pratiquée avec l'aide du miroir laryngé seulement et au moyen du bistouri courbe à forme de lance de Hering. Après expectoration de quelques centimètres cubes de pus sanguinolent, le malade se trouve immédiatement soulagé et il put quitter l'hôpital guéri, moins de cinq jours après son admission.

Special Correspondence

The London Letter

(From our own correspondent)

TUBERCULOSIS IN ENGLAND

From time to time mention has been made of the effect of wartime conditions upon tuberculosis and already there are alarming signs that the downward trend of mortality has been materially arrested, especially for the young adult, and that tuberculous meningitis in children is on the increase. Up till recently all that was done was to observe these facts. But with

the publication of the Medical Research Council's report on tuberculosis in wartime, and the Minister of Health's prompt promise of action, the whole picture has changed.

The main recommendations of general interest are the introduction of mass radiography and the financial provision for patients with the disease. Under the former heading the Minister has announced that 30 units are to be ready in a few months' time, each capable of dealing with 1,000 miniatures a day, and as regards the latter local authorities have been told that the help afforded by National Health Insurance is not enough: they are to see that financial assistance is granted to bread-winners while in hospital or sanatorium so that their treatment is fully completed without the need for early return to full earning capacity for the family's sake.

The increase in tuberculous meningitis is probably linked with the evacuation of children and the crowded conditions of black-out and shelter life. The former means that a change from the safe, pasteurized milk of certain enlightened cities to the dangerous so-called fresh, pure milk ("straight from the cow") in the country has exposed children increasingly to bovine infection. The M.R.C.'s Committee says quite simply in a major recommendation "The pasteurization of milk should be extended throughout the country"—a point of view readily acceptable to Canadian readers but one which in this country still raises the most infernal opposition in political circles.

It must not be thought that the tuberculosis problem will be entirely solved along the lines discussed: many problems still exist. The Prophit Survey of the Royal College of Physicians of London has recently issued a preliminary report which indicates some of these problems. One of great interest concerns the tuberculin-sensitivity of nurses: should only Mantoux positive girls be employed if there is a risk of exposure to infection? The Survey has not answered this yet but it looks as if the answer must be an emphatic "yes".

Health in Industry

The powers-that-be are naturally very concerned that the health of the members of the armed forces shall be kept at as high a level as possible. Critics even state that this is being achieved by reducing the medical attention available for civilians, but in general this cannot be true, because the nation's health is keeping to a high standard. But in total war the industrial army is as important as the fighting forces and hence the health of the industrial worker should be as tenderly nurtured as that of the soldiers, sailors and airmen.

Now there are numerous Factory Acts concerned with this problem—accident prevention, proper ventilation, heating and reasonable hours of work are all controlled, in theory. But in the annual report of the Chief Inspector of Factories it is somewhat sadly observed that if maximum production is to be obtained the general requirements of the Factory Acts should be observed—suggesting that everything is in fact not being done for the workers' health.

But there is much more activity than some years ago and the number of medical officers in industry is steadily increasing. More is being done for feeding the industrial worker, rest houses for providing tired workers with holidays are being established and much is being done for rehabilitation of the injured workmen. One of the problems in industry is the increase in accidents, due to the great number of young, inexperienced workers, and it raises once again the question of accident prone-ness. The Industrial Health Research Board has conducted research into this for many years and much is known on preliminary testing. It may well be that in time to come—or even now since the need is great—accidents will be dealt with radically by keeping out of dangerous jobs those whose inco-ordination makes them liable to fail.

Electricity in Court

At the "Brain's Trust" the other evening the anonymous physician gave as one of the seven wonders of the modern world the application of electricity in diagnosis. An interesting example of this was recently seen in a trial for a peculiarly brutal murder in which the defence claimed that a head injury shortly before the alleged crime had produced such disturbance of mind that the prisoner was, in fact, insane. Expert evidence was adduced to prove that an electroencephalogram showed changes compatible with this otherwise unconfirmed history of a head injury and the verdict of "guilty but insane" was subsequently brought in.

Lord Nuffield—Medallist

This great medical benefactor—often referred to in these letters for his enlightened support of medical work—was the other day made the nineteenth recipient of the honorary medal of the Royal College of Surgeons. Lord Nuffield has always been more concerned with the support of workers in medicine than with the buildings in which they work. The result has been that over a very wide area advancements of the healing art have been made directly or indirectly as a result of Lord Nuffield's generosity.

ALAN MONCRIEFF

London, November, 1942.

Canadian Medical War Services

Appointments of Consultants

A policy has been adopted by the Director General of Medical Services to increase the number of consultants attached to N.D.H.Q.

In the past these duties have been carried out by Colonel E. W. Archibald and Colonel W. P. Warner. In spite of their utmost efforts, it has been found an almost impossible task for them to perform adequately. In order to relieve them of part of this burden, Lt.-Col. J. D. Adamson and Lt.-Col. G. Fahrni have been appointed. The region coming under their responsibility will be from the head of the Great Lakes westward. If, and when, necessity arises, further appointments to this office will be made.

It is hoped that consultants will bring to the officers of the R.C.A.M.C. professional guidance in newer aspects of medicine and surgery, not only from the point of view of the Army requirements, but also those of civil practice, in order that all the officers, and particularly those of recent graduation, may be kept informed.

It is desired by the Director General of Medical Services that no stone be left unturned to maintain the high professional standards of the Medical Corps.

Hospital Car

Completion of a third hospital car for use in this country by the Royal Canadian Army Medical Corps was marked November 18th last by official inspection and approval of Honourable J. L. Ralston, Minister of National Defence, at Ottawa. The Minister commended the Canadian National Railways and Lieut.-Colonel E. L. Stone, C.M.G., A.M.D.6, R.C.A.M.C., who designed the car interior. Major-General H. F. G. Letson, Adjutant General; Brigadier E. J. Renaud, O.B.E., representing the Quartermaster General; Brigadier J. C. Meakins; Colonel G. A. Winfield; Lieut.-Colonel T. A. Lebbetter; Lieut.-Colonel E. L. Stone, C.M.G.; Colonel E. W. Archibald; Major J. D. Kinsman and Major T. R. McLeod of the Royal Canadian Army Medical Corps, and Brigadier S. Lett, D.S.O., veteran of Dieppe, were among the officers favourably impressed by the new equipment. Matron D. I. MacRae represented the Nursing Service, and a representative of the Royal Canadian Air Force was present.

The new car accommodates 28 lying cases in double decker beds of regulation Army hut size. They are painted white. Converted from a parlour car, the vehicle provides a compact dressing room with sink and running water. There is a gas plate for warming drinks. Ample locker space is in evidence for kits of invalids and hospital linen. Three toilets, with special provision for cleansing bed pans along with chrome finished washroom are features. Wide weather proof doors on either side of the car combine with roomy aisles to facilitate loading of stretcher cases. The exterior is painted a khaki shade with the conventional Red Cross and "R.C.A.M.C." inscribed. Modern heating equipment assures comfort, and the car is of steel under construction, with plate steel body. Ice refrigeration will be employed.

This railway equipment will be placed in immediate service for repatriation of stretcher cases from overseas, acting alone or in conjunction with two other cars completed some months ago. The latter provide accommodation for eight lying cases in standard beds. The drawing room has been set aside for nursing sisters, and a chambrette in the opposite end of each car is reserved for the medical officer, or for use as a private hospital room. A dispensary and kitchenette, along with shower bath is provided in the older cars. In the new type these features have been dispensed with, that a maximum of bed space be made available.

With all three hospital cars meals are to be served staff and patients from the railway diner which constitutes part of the special train. A porter accompanies each car, and is in part responsible for blankets, linen, and equipment. It is proposed to employ one medical officer, three nursing sisters; and three medical orderlies for each tandem of two hospital cars. Previously one medical officer, two nursing sisters, and two medical orderlies were assigned to each hospital car attached to an invalid train. While a tandem of two cars for lying cases is the ideal set-up, units of one, two, or more such cars can be utilized as conditions warrant.

Walking and bed-sitting personnel will be transported in standard Pullman or tourist cars which form part of the hospital train. The latter usually is made up of baggage car; Pullmans for ambulatory cases; diner; and two hospital cars. Equipment, including special bed serving trays; and drugs is carried as indicated, and the medical officer in charge is responsible for complete documentation of patients during the period of his supervision. His duties also prescribe that he superintend transfer of invalids to ambulances in co-operation with District Medical Officers upon arrival at the respective destinations.

The hospital cars are equipped for long distance travel, such as coast to coast across the Dominion. The chief function of cars of this type is that they can be added to any train carrying wounded or convalescent Army personnel, becoming the active and effective centre of medical and surgical care for all patients on board.

Prophylactic Tetanus Antitoxin for All Battle Casualties

The War Office of the United States has reminded medical officers that antitoxin should be given to all battle casualties, even though they have had tetanus toxoid in the past or

tetanus antitoxin recently. It should also be given to patients suffering from any wound that seems likely to be infected with tetanus. When given subcutaneously the maximum level in the blood is not reached for three or four days, but by deep intramuscular injection the same level is reached much more rapidly. Deep injection into the deltoid subscapular or outer quadrant of the gluteal regions should be the normal route. Intravenous injection is not recommended for prophylaxis because of the possibility of anaphylaxis. The minimum dose should be 3,000 units. For very foul lacerated wounds, this should be doubled or trebled. If there is documentary evidence of active immunization with toxoid, a single dose of antitoxin is sufficient. Otherwise two further doses of 3,000 units should be given at weekly intervals.

Community Doctor Service

Many inquiries are being received by the Canadian Medical Procurement and Assignment Board for physicians in rural communities. Apropos of this, it is noted that the Canadian Red Cross, Ontario Division, in cooperation with the Ontario Medical Association and the Department of Health, has inaugurated a community doctor service which, according to the *Canadian Public Health Journal,* is an emergency wartime measure to assist rural and isolated communities to obtain the service of general practitioners.

More than 25% of the doctors of Ontario have gone into the forces or volunteered for other war services. A minimum of $4,000 is guaranteed by the Ontario Division of the Red Cross. The basis of service is general practice. No extra fees can be charged for any "added" service to the subscriber. The doctor provides his own transportation to the hospital, which must be within 25 miles. Patients furnish their own drugs and supplies except in emergency or office care. Provision is made for a locum tenens for a two weeks' holiday at the expense of the administration and for leave of absence for postgraduate study at the expense of the community doctor. As far as possible, the usual patient-doctor relationship is maintained.

Before the introduction of a new service and once each year thereafter a family-to-family canvass is made for subscribers by the local Red Cross. Although dues are paid on a per capita basis, families which choose to become subscribers must participate as a unit. However, reduced rates are offered to families with many dependent children and no charge is made for the sixth and additional child. Families who do not subscribe in advance have to wait thirty days (maternity, nine months) for service. Non-subscribers are related to the plan only with respect to the guaranteed income. Emphasis on prevention arises from the prepayment feature and the appointment of the community doctor as medical officer of health. The doctor's duties are understood to include antepartum and infant welfare care, immunization and school health as well as the usual attention to municipal sanitation.

Abstracts from Current Literature

Medicine

Salicylate Prophylaxis in Rheumatic Fever. Coburn, A. F. and Moore, L. V.: *J. Pædiat.,* 1942, **21**: 180.

Several independent studies have shown that rheumatic fever can be prevented if the rheumatic subject is protected from hæmolytic streptococcic infection, either by changing his environment or by maintaining a high blood level of sulfanilamide. Both of these methods have their drawbacks. Clinical observations on the effectiveness of acetylsalicylic acid in preventing serum sickness and *in vitro* studies on the interference of antigen-antibody precipitation by salicylates suggested a reinvestigation of salicylate prophylaxis in rheumatic children exposed to the prevalent respiratory infections. A daily dose of 4 to 6 grm. of salicylates, depending on the size of the patient, was given at the onset of the pharyngitis where throat culture showed the presence of hæmolytic streptococci Group A. This was continued for one month. Forty-seven young rheumatic subjects received this prophylactic therapy, and only one developed rheumatic fever; 139 patients were untreated; 82 escaped and 57 developed rheumatic fever. These observations suggest that rheumatic fever can be prevented by the administration of salicylates during the respiratory infection and silent phase. S. J. USHER

Myocardial Infarction. Rathe, H. W.: *J. Am. M. Ass.,* 1942, **120**: 99.

The author's purpose of this analysis has been to evaluate the various clinical symptoms and signs as they relate to the prognosis in acute myocardial infarction. The factors considered to be of prognostic importance are listed according to their statistical value as determined by a certified statistician.

In this study of 274 cases of myocardial infarction, a poor prognosis was indicated when: (1) a sinus tachycardia of 100 persisted over 5 days; (2) the age of the patient was over 55 years; (3) the systolic blood pressure dropped suddenly and failed to rise again to a level of 100 mm. of mercury within five days; (4) unusual fatigue and apprehensiveness were prominent during the early convalescent period; (5) congestive heart failure developed; (6) the pulse pressure was 20 mm. of mercury or less;

(7) the electrocardiogram revealed an anterior infarction or an indeterminate infarction; (8) there was a gallop rhythm present.

A good prognosis was indicated when the aforementioned factors were not predominant. This was especially true if, (1) the patient was under 55 years of age; (2) the heart rate did not reach 100, or if it dropped within two or three days to 90 or less; (3) the blood pressure returned to a near normal level; (4) the heart was not enlarged; and (5) there were no signs of cardiac insufficiency. The patient in whom these good prognostic signs predominate should live many years if carefully managed.

S. R. TOWNSEND

Primary Carcinoma of the Lung. Perrone, J. A. and Levinson, J. P.: *Ann. Int. Med.*, 1942, **17**: 12.

The authors present a series of 115 primary carcinomas of the lung: 38 of these are autopsy cases; 77 were diagnosed by means of a bronchoscopic biopsy.

They find a relative and absolute increase in incidence, their series accounting for 13% of the total number of carcinomas. Cough, dyspnœa, hæmoptysis, and pain are the four cardinal symptoms of carcinoma of the lung. Bronchoscopic examination is by far the most important diagnostic procedure available. Of the 77 cases diagnosed by bronchoscopic examination, only 3 cases were amenable to surgical treatment. Of this same group, 76 were dead within 3 to 18 months from the time of diagnosis.

Lobectomy or pneumonectomy in suitable cases is the treatment of choice. S. R. TOWNSEND

Transitory Pulmonary Infiltrations Mistaken for Tuberculosis. Karan, A. A. and Singer, E., *Ann. Int. Med.*, 1942, **17**: 106.

Five cases of non-tuberculous pulmonary disease mistaken for pulmonary tuberculosis are presented. Reliance on a single chest roentgenogram for diagnosis frequently leads to error.

It is pointed out that when tubercle bacilli cannot be found in the sputum or aspirated gastric contents by all methods of examination, including cultures and guinea pig inoculation, it is extremely unlikely that the bronchopulmonary disease is of tuberculous causation.

The clinical picture and pathogenesis of pulmonary infiltrations associated with eosinophilia are discussed. S. R. TOWNSEND

Coccidioidal Granuloma (Coccidioidomycosis), its Incidence in Man and Animals and its Diagnosis in Animals. Stiles, G. W. and Davis, C. L.: *J. Am. M. Ass.*, 1942, **119**: 765.

Coccidiosis is ordinarily considered a rare disease confined chiefly to California. It goes variously under the names of coccidioidal granuloma, valley fever, desert fever, desert rheumatism, and San Joaquin Valley fever. The authors suggest that it may not be so rare as is supposed and is not necessarily confined to California.

Coccidioidal infection is found in two forms, the primary acute uncomplicated type with low mortality and the highly fatal chronic form, coccidioidal granuloma. The former resembles influenza and may be associated with a rash resembling erythema nodosum or erythema multiforme. The latter type is a chronic progressive disease affecting the lungs, skin, lymph nodes, bones and meninges. It closely resembles tuberculosis and undoubtedly is often mistaken for it.

The disease is caused by a spore-forming fungus and is probably transmitted by contaminated dust. Spores have been recovered from the soil in districts where the disease is known to have occurred. Although most of the reported cases have originated in California a not inconsiderable number have been discovered in other States. There is some reason to believe that the disease is becoming disseminated and in this process infected animals may play an important part. Ordinarily cattle affected with coccidioidal granuloma shows no symptoms. The lesions are usually confined to the lymph nodes and the lungs and are detected only when the animal is slaughtered.

In culture the organism grows as mycelia, but in the tissues it appears in spherical form with a double contour capsule. Usually granulomatous changes are associated with the spheroids and frequently giant cells. The coccidioidin skin test is of value in making the diagnosis.

FRANK G. PEDLEY

Surgery

Carcinoid Tumour of the Appendix. Hopping, R. A., Dockarty, M. B. and Masson, J. C.: *Arch. Surg.*, 1942, **45**: 613.

Though carcinoid tumours of the stomach, the small intestine, and the colon are frequently classed as being malignant, yet tumours of an exactly similar nature occurring in the appendix, are regarded as being essentially benign. Recorded instances of no less than 16 metastasizing appendiceal carcinoids bear witness to the fact that these seemingly innocent neoplasms are capable of widespread dissemination. The authors report an instance of this nature in a woman of 47 years. Besides a carcinoid tumour of the appendix there was a solid malignant tumour of the right ovary and metastases in the right iliac lymph nodes.

The authors share the belief with many that all of these tumours are adenocarcinoma of grade 1 malignancy (Broders). This diagnosis appears to be accurate, to designate a specific entity, and to separate this entity from the ordinary type of adenocarcinoma, which is accompanied by a somewhat worse prognosis.

G. E. LEARMONTH

Appendiceal Obstruction in the Non-inflamed Appendix. "L'obstruction appendiculaire sans réaction inflammatoire." Murphy, W. B.: *Surg., Gyn. & Obst.*, 1942, **74**: 968.

L'auteur présente certaines variations anatomiques de l'appendice en vue de suggérer une relation entre elles et les signes cliniques des maladies de cet organe, tels qu'ils nous sont connus. Il base son étude sur des critères histologiques destinés à faciliter le diagnostic de l'oblitération de la lumière appendiculaire. L'obstruction semble relever de causes mécaniques plutôt qu'inflammatoires. Les facteurs étiologiques de l'obstruction seraient présents dès la naissance. Un appendice peut produire des symptômes sans lésion inflammatoire. L'auteur ne croit pas que le terme "appendicite chronique" réponde à une entité clinique définie, mais sert plutôt à couvrir tous les cas qui ne montrent pas de processus inflammatoire.

Les fonctions utiles de l'appendice continuent d'être ignorées. Au point de vue anatomique, l'appendice doit être considéré comme un cœcum non développé. Au point de vue embryologique, c'est un organe régressif, certainement plus développé chez le fœtus que chez l'enfant. Sa localisation dans la cavité péritonéale est très variable. Un appendice obstrué offre une prédisposition évidente à l'appendicite aiguë. Pourtant, l'obstruction appendiculaire peut exister sans manifester de signes ou de symptômes classiques. PIERRE SMITH

Drainage and Wound Closure Technique in Appendicitis Operations. "Technique de drainage et de réfection pariétale dans les opérations de l'appendicite." Auchincloss, H.: *Ann. Surg.*, 1942, **116**: 435.

Une appendicectomie peut être une des opérations les plus faciles en chirurgie comme l'une des plus difficiles. La localisation exacte de l'appendice est importante à cause de la variation des endroits qu'il occupe. L'auteur indique les moyens cliniques courants qui permettent cette localisation avant l'opération. Il recommande également de procéder à une exploration minutieuse, une fois l'incision de Mac-Burney pratiquée, avant d'extirper un appendice enflammé hors de sa cavité. Seule l'expérience et l'habileté précisent les cas où il vaut mieux ne pas réséquer un appendice gravement infecté et abcédé et procéder à un simple drainage. Mais ce sont généralement des cas exceptionnels.

L'auteur discute ensuite l'aphorisme: "en cas de doute, drainez" et souligne les dangers de contamination qui peuvent en résulter. En cas d'infection grave et lorsqu'il s'agit de personnes dont la résistance physique est éprouvée, le drainage est à conseiller. Certaines précautions sont à prendre afin d'éviter la nécrose des tissus et le danger d'éviscération. L'usage d'agents sulfamidés — sulfanilamide ou sulfathiazol—se répand comme désinfectant et cicatrisant.

L'auteur conclut par l'énoncé de certains principes de suture de la paroi abdominale dans les diverses modalités que peut présenter l'opération pour appendicite. PIERRE SMITH

Obstetrics and Gynæcology

Carcinoma of the Body of the Uterus. Barns, H. H. F.: *J. Obst. & Gyn. Brit. Emp.*, 1942, **49**: 173.

Ninety-five cases of carcinoma of the body of the uterus are reviewed. The greatest age-incidence of the patients (50.5%) was between the years 50 to 59. In the majority of cases (83.14%) the disease occurred after the menopause, the onset of which was probably delayed by some months. The relation between hormones, endometrial hyperplasia, and carcinoma of the body of the uterus is briefly discussed. Multiparæ and nulliparæ were affected in approximately equal numbers. Bleeding *per vaginam* was the cardinal symptom. The tendency for the vaginal discharge to be or become persistent is stressed. Only 14.9% of the patients complained of pain and in the majority of cases it was a late symptom.

The majority of patients (62.2%) had an enlarged uterus. Fibroids were present in 24.3% of the cases and mucous polypus of the cervix in 5.3%. P. J. KEARNS

The Eclamptic Phenomenon and Placental Ischæmia. Young, J.: *J. Obst. & Gyn. Brit. Emp.*, 1942, **49**: 221.

Pregnancy toxæmia (pre-eclampsia and eclampsia) is preceded and determined by an abortion factor. This operates by causing an interference with the maternal circulation in the placenta. Two alternative mechanisms can be recognized: (*a*) The stasis or complete arrest of the blood-flow is restricted to certain regions, resulting in a local area or local areas of placental degeneration. When, after complete arrest of the blood-flow, there is a sufficient interval of fetal survival with continuing circulation in the remaining placenta. (*b*) The vascular changes are widespread throughout the decidua (and sometimes also in the uterine musculature) and consist of dilatation and free blood extravasation, both of which may reach an extreme degree. The retro-placental bleeding is an extreme expression of this widespread vascular disturbance. In many instances (*a*) and (*b*) are found to have been in operation in the same placenta. The toxæmia develops subsequent to the placental degeneration. It is related to the early stages of this process, and its severity is determined both by the extent of the placental involvement and by the interval during which the fetus survives *in utero* (and the circulation continues) between the onset and the maximal development of this involvement. Evidence has been given that at least half of the placenta may be thus compromised before fetal death occurs.

In concealed accidental hæmorrhage (in which an extensive muscular lesion is also often present) an acute renal lesion with blood-stained urine, oliguria or suppression, and a rapidly rising blood urea, may be superimposed on the typical pre-eclamptic or eclamptic phenomenon. The resemblance between this syndrome and the "crush syndrome" in regard to genesis, clinical features and morbid anatomy, is analyzed.

P. J. KEARNS

Convulsions Following the Intravenous Administration of Pituitary Extract. Sullivan, C. L. and Heffernan, R. J.: *Am. J. Obst. & Gyn.*, 1942, **44**: 675.

A case of post-partum convulsions in an apparently non-toxic parturient patient following the intravenous administration of three minims of pituitary extract is recorded. ROSS MITCHELL

The Colostrum Test for Pregnancy in a Prenatal Clinic. Pulver, M. and Poser, L. B.: *Am. J. Obst. & Gyn.*, 1942, **44**: 690.

A negative reaction is 97.4% accurate in diagnosing actual pregnancy. A positive reaction is 75% incorrect in the diagnosis of non-pregnancy. In pregnant women the colostrum test will give a correct (negative) reaction in 94% of the cases. In non-pregnant women the test is 56% wrong. The test lacks the accuracy and reliability of the Aschheim Zondek test in doubtful cases. It would be misleading to consider a positive reaction as either definite or presumptive evidence of the non-pregnant state.

ROSS MITCHELL

Clinical Observations in Treatment of Nausea and Vomiting in Pregnancy with Vitamins B_1 and B_6. Willis, R. S., Winn, W. W., Morris, A. T., Newsom, A. A. and Massey, W. E.: *Am. J. Obst. & Gyn.*, 1942, **44**: 265.

Almost complete relief from nausea and vomiting of pregnancy was gained by administering vitamins B_1 and B_6 in a varying dosage at irregular intervals and by either the intramuscular or intravenous route. Relief from nausea and vomiting occurred more often and more completely with the use of vitamin B_6 than with vitamin B_1. Many patients returned for injections only when nausea and vomiting reappeared. No undesirable reactions were noted. Two patients were relieved of an accompanying migraine. This vitamin should be investigated as to its effects on vomiting due to other drugs such as morphine, sulfanilamide, and others.

ROSS MITCHELL

Pædiatrics

Concurrent Immunization against Tetanus, Diphtheria, and Pertussis. Miller, J. J., Jr. and Saito, T. M.: *J. Pæd.*, 1942, **21**: 31.

Simultaneous administration of three or more antigens has been adopted in France under the leadership of Ramon. He has advanced evidence indicating that the effect of each antigen is thereby enhanced rather than impeded. Concurrent immunization of 100 children, most of them between the ages of 6 and 12 months, with combined alum-precipitated diphtheria and tetanus toxoids and *H. pertussis* vaccine was done. It yielded satisfactory results, as determined respectively by Schick tests, tetanus antitoxin titrations, *H. pertussis* agglutination tests, and exposures to whooping cough. Concurrent injections of fluid diphtheria and tetanus toxoid, together with *H. pertussis* vaccine, yielded relatively poor responses in tetanus antitoxin, but satisfactory immune responses with respect to diphtheria and pertussis. A three-months' interval between the first and second injections of 1 c.c. of the combined alum-precipitated toxoids is recommended. A third injection of 1 c.c. of alum-precipitated tetanus toxoid alone is given 3 or 4 months later, followed by 0.5 c.c. a year after this injection. Three doses of *H. pertussis* vaccine, a total of 80 billion organisms, were given at two-weeks' intervals, the first one coinciding with the first dose of the combined toxoids, the other arm being used.

S. J. USHER

Neurology and Psychiatry

The Effect of Drugs on Children with Behaviour Disorders. Lindsley, D. B. and Henry, C. E.: *Psychosomatic Med.*, 1942, **4**: 140.

This is a report of a study undertaken to determine whether certain types of drugs frequently used in clinical practice to control various types of neurological disorder will modify the behaviour of problem children. A group of 13 children who were markedly negativistic, showed signs of impulsiveness, destructiveness, stealing, lying and were abnormally aggressive, were observed in a hospital environment during a six-week period. Electroencephalographic studies and behaviour ratings were made involving control periods without medication and periods of medication. The drugs used were benzedrine, phenobarbital and dilantin. The results show that behaviour improved strikingly under benzedrine medication. Marked improvement of behaviour also resulted from the use of dilantin, but this drug was less effective than benzedrine. Phenobarbital following a period of improved behaviour under benzedrine caused an exacerbation of symptoms, although when compared to the behaviour ratings during an initial control period it was found to improve slightly the behaviour of some of the children and make it slightly worse in others. Of special interest is the fact that while the electroencephalographic changes under this treatment did not indicate favourable progress, the behaviour of the children was none the less noticeably improved by the use of these drugs, particularly benzedrine.

BARUCH SILVERMAN

Factors in the Early Behaviour of Psychotic Children as Related to their Subsequent Mental Disorder. Yerbury, E. C. and Newell, N.: *Am. J. Ment. Def.*, 1942, **47**: 70.

The authors report a study of 56 psychotic patients under 19 years of age, who were in the mental hospitals of Massachusetts and who were considered to be of normal mentality prior to the onset of their illness. An analysis of the early behaviour and personality patterns which appeared to have a definite relationship to the development of the psychosis, indicated that these patients had always manifested an inability to get along with other children, and could not make a normal social adjustment. They had a tendency to remain immature and dependent upon some adult or to become spiteful and antagonistic. Three distinctive personality patterns characterized the behaviour of these patients from early childhood. The seclusive pattern, associated with arrested social development, attachment to a parent, immaturity, lack of self-confidence and dependence on protection. The perfectionist pattern, which developed under the influence of over-moralistic parents, and was characterized by submissiveness, over-conscientiousness, over-religiousness, some suicidal tendencies and occasional delinquent behaviour. The aggressive pattern, which manifested itself by disobedience, quarrelsomeness and destructiveness. This pattern was found to be conditioned by physical disease, violent home life, and lack of affection. The authors conclude that there is an urgent need for increasing the recreational, educational and occupational facilities for children who are socially immature, so that they may be given an opportunity to develop normally and make a satisfactory adjustment to life. They also recommend the development of more clinical facilities for the diagnosis and treatment of children who show early signs of abnormal or anti-social behaviour. BARUCH SILVERMAN

Pathology and Experimental Medicine

Morquio's Disease Associated with Mental Defect. Farrell, M. J., Maloney, J. D. and Yakovlev, P. I.: *Arch. Neurol. & Psychiat.*, 1942, **48**: 456.

The spectacular deformities of the skeletal system which characterize Morquio's disease were present in a sister and brother aged 19 and 14 years respectively. They were the result of the fifth and seventh of seven pregnancies, of which three resulted in normal girls, one in a normal boy, and one ended in a miscarriage. The parents were first cousins. Gargoylism has many features in common with Morquio's disease, but the enlarged spleen and liver, the cloudy corneas, the misshapen head and hypertelorism characteristic of gargoylism were lacking in these patients. There was present in these persons, however, mental defect, not usually reported as occurring in those affected with Morquio's disease.

Note.—The presence of a defect in several offspring of related parents suggests that the defect is hereditary and dependent upon the presence of a recessive gene.

MADGE THURLOW MACKLIN

Familial Spastic Paralysis. King, H. N.: *Med. Bull. Vet. Adminis.*, 1942, **18**: 332.

The hereditary nature of this disease is exemplified by the numerous pedigrees in which it is found. In this family, spastic paralysis had affected seven persons in four generations; a woman, one of her daughters, two daughters and two sons of the last. The affected man in the fourth generation was a nephew of the latter four patients, being the only child of the one apparently normal person in the third generation, a man who was brother to the four patients just mentioned. This skipping of a generation may be more apparent than real, and the disease may occur in the unaffected father at a later date. On the other hand external circumstances may be necessary to precipitate the symptoms of the disease.

MADGE THURLOW MACKLIN

Familial Syringomyelia and Status Dysraphicus. Mulvey, B. E. and Riley, L. A.: *Ann. Int. Med.*, 1942, **16**: 966.

A family record is reported in which a nervous disease was present through three generations. The first person known to have it was the grandfather who ran away from home as a young boy, thus losing contact with his family, and depriving him of any knowledge of the disease in others of his family. He had 14 children, of whom 12 were boys and 2 were girls. Three of the 12 boys developed a condition like that of their father. Two of these affected brothers had children; the first had 3 sons, with one of them affected, and 4 daughters with 3 affected. The second affected brother had 2 sons and one daughter, all affected.

The disease presents various degenerative constitutional signs, consisting of impaired circulation to the extremities, disturbance of sensation in the lower limbs and feet, and in a few members similar disturbances in the hands, deformities of the feet with trophic ulcers, dissociation of sensation especially of heat and pain. The disease lacks the progressive nature of syringomyelia which is conceived of as a gliosis of the cord. Status dysraphicus, which is looked upon as the constitutional substratum of syringomyelia consists of a faulty closure of the neural tube in embryonic life, and in the one member submitted to roentgenological examination a spina bifida occulta was demonstrated.

Some of the anatomical stigmata of the disease may be present in members of the family which have not revealed any clinical indications, but may be found when sought for.

MADGE THURLOW MACKLIN

Diphtheria Immunization with Fluid Toxoid and Alum-Precipitated Toxoid. Volk, W. K. and Bunney, W. E.: *Am. J. Pub. Health,* 1942, **32**: 690.

The purpose of this study was to determine the antitoxin response to different immunizing procedures against diphtheria. These procedures were: 1 dose of fluid toxoid, 2 doses of fluid toxoid, 3 doses of fluid toxoid (at 3 weeks' interval); 1 dose of alum-precipitated toxoid and 2 doses of alum-precipated toxoid (at 3 weeks' interval).

Two thousand four hundred and eighty-seven children from rural communities in Michigan were studied. Before beginning immunization the children were bled and the antitoxin content of the blood determined. The children were again bled 4 months after the commencement of immunization, again at 12 months, and at successive 12 months' periods until the completion of the study. The reason for doing the serum assay rather than the Schick test was the belief that the Schick test material was in itself antigenic.

Results, as judged by the rise in serum antitoxin, showed the best antitoxin response to follow 2 injections of alum-precipitated toxoid and in descending order of value; 3 injections of fluid toxoid, 1 injection of alum-precipitated toxoid, 2 injections of fluid toxoid, and 1 injection of fluid toxoid. Among the 614 injections of alum-precipitated toxoid there were 2 definite abscesses which were sterile and 2 reactions suspicious of abscess formation.

FRANK G. PEDLEY

Hygiene and Public Health

Development of Tuberculosis and Changes in Sensitivity to Tuberculin in an Institution for the Feebleminded. Zachs, D. and Sartwell, P. E.: *Am. J. Pub. Health,* 1942, **32**: 732.

In the Walter E. Fernald State School in Massachusetts, 1,656 inmates were tuberculin-tested and x-rayed in 1930. One thousand and twenty-three of these were again studied in 1940. The following table gives a picture of the change in reaction to tuberculin during that time.

Age-group	*Number tested in 1930*	*Percentage positive to 1 mgm. or less O.T.*
5 to 9	56	39
10 to 14	269	56
15 to 19	384	77
20 to 24	255	84
25 to 29	147	92
30 to 39	275	97
40 to 49	186	98
50 +	84	95
All ages	1,656	81

Age-group	*Number tested in 1940*	*Percentage positive to 1 mgm. or less O.T.*
15 to 19	43	67
20 to 24	161	78
25 to 29	172	87
30 to 34	159	94
35 to 39	117	97
40 to 49	197	99
50 to 59	125	99
60 +	49	98
All ages	1,023	91

Although this table indicates a tendency to an increase in the number of reactors as age proceeds, nevertheless some of the positive reactors in 1930 changed to negative during the ten-year period.

RETEST OF POSITIVE REACTORS

Age in 1930	*Number retested*	*Number who remained positive*	*Number who became negative*
5 to 9	21	19	2
10 to 14	105	91	14
15 to 19	139	130	9
20 and over	627	623	4

In reviewing the incidence during the 10-year period, 21 cases of tuberculosis were discovered among the 1,656 originally tested. The incidence among the original reactors was 0.8% and among the original non-reactors it was 3.2%.

FRANK G. PEDLEY

Reimmunization Against Diphtheria of Previously Immunized Children. Volk, V. K. and Bunney, W. E.: *Am. J. Pub. Health,* 1942, **32**: 700.

The following is the authors' summary of their study of 808 children:

1. That diphtheria antitoxin immunity, regardless of the immunizing procedure, is not permanent and that, as time goes on, the antitoxin content of the blood is reduced. It is apparent that progressive reduction of antitoxin content, although slow, is very definite. This has been pointed out by other workers.

2. That reimmunization with fluid toxoid or alum-precipitated toxoid is highly effective, and one small dose produces a response in a satisfactory proportion of children.

3. That no general allergic reactions were observed in the entire group, and the percentage of local reactions was not severe enough to discourage reimmunization.

4. That the previously immunized children who had lost all demonstrable antitoxin responded much better to a single injection than children not previously immunized and without demonstrable antitoxin.

5. That reimmunization of children 5 or 6 years after immunization in infancy would maintain the blood antitoxin at a good average level.

6. That alum-precipitated toxoid is somewhat superior to fluid toxoid as a reimmunizing agent, although its comparative effectiveness as an agent for primary immunization is much more striking.

Therefore, the procedure recommended by the Committee on Administrative Practice of the American Public Health Association, consisting of immunization in early childhood and reimmunization upon entering school, is practical. Widespread use of such a procedure should approach complete eradication of diphtheria.

FRANK G. PEDLEY

Obituaries

Dr. Samuel Hanford McKee died on November 25th. Dr. McKee, who was in his 66th year, suffered a heart attack two weeks ago from which he failed to recover. Until he resigned a year ago, he had been chairman of the Medical Board of the Montreal General Hospital and head of the department of ophthalmology at that institution, as well as professor of ophthalmology at McGill University from which he had graduated as M.D. and C.M. in 1900.

A native of Fredericton, N.B., where he was born in October, 1875, Dr. McKee received his early education in that city and earned his B.A. degree at the University of New Brunswick in 1896, winning the Douglas Gold Medal. He was captain of the university's football team during his undergraduate days, and took an interest in sports throughout his life.

Dr. McKee first served as a house doctor at the Royal Victoria Hospital under Drs. F. Buller and H. S. Birkett. Later he went abroad to study at Freiburg, Germany, and on his return to Montreal became an eye specialist. A few years later he returned to Europe, this time with the Canadian Medical Corps. He saw service at Salonika and was twice mentioned in despatches. He was subsequently given command of the Canadian Eye Hospital at Shorncliffe, with the rank of colonel. He was awarded the C.M.G. for distinguished service in the field.

For some years Demonstrator in Bacteriology and also in Ophthalmology at McGill University. Appointed Clinical Professor of Ophthalmology in 1928 and Director of the Department of Ophthalmology at the Montreal General Hospital in 1931. He was Chairman of the Medical Board of the Hospital in 1938. He was Secretary of the Montreal Medico-Chirurgical Society from 1908 to 1924, with the exception of the war period, and President of the Society in 1925. He was a member of the Council of the Canadian Medical Association for many years. Made 3rd Vice-president of the American Academy of Ophthalmology and Otolaryngology in 1922 and a member of the Council for the years 1924-1926. President in 1932. Member of the Council for the three years following.

Member of the American Ophthalmological Society and the Association for Research in Ophthalmology. For many years, until recently, member of the American Association of Pathologists and Bacteriologists. In 1933-4-5, a member of the Board of Trustees of the Pan-American Medical Association, and a Vice-President of the Section of Ophthalmology.

Made honorary member of the Chicago Ophthalmological Society, and also of the Kansas City Society of Ophthalmology and Otolaryngology.

Invited to give special address to the following: Oxford Ophthalmological Congress, 1920, the Ophthalmological Society of St. Paul and of Pittsburgh, the American College of Surgeons meeting at St. Louis in 1932, and the meeting in Chicago, 1937. The Rochester Ophthalmological Society in 1933, and the New England Ophthalmological Society in 1934.

He gave numerous courses in the instructional work at the American Academy of Ophthalmology and Otolaryngology. In 1935, he gave a special lecture for the National Society for the Prevention of Blindness on "Syphilis of the eye". In 1937, 1938 and 1939 took part in the Postgraduate Course at George Washington University, Washington, D.C.

In his special field Dr. McKee did outstanding research work, particularly in regard to various forms of conjunctivitis. He developed a special method for demonstrating gonorrhœal infection of the eye. The bibliography of his published papers is the most extensive of any Canadian medical man of his generation.

Dr. McKee was eye specialist for the Children's Memorial Hospital, the Alexandra Hospital and the Montreal Children's Hospital, and was consulting ophthalmologist for the Royal Victoria Hospital.

He is survived by his wife, formerly Shirley Britton Cowan, of Gananoque, Ont., whom he married in August, 1906; a brother, A. Hamilton McKee, of Ottawa, and three sisters, Mrs. Harry Robertson, of Saint John, N.B., Mrs. Frank Baird, of Chipman, N.B., and Mrs. Thomas Fowler, of Fredericton, N.B.

Dr. Valentine E. Barrow, of Whitecourt, passed away recently on his farm near Whitecourt, Alberta, where he had been practising a number of years. Born in 1865 in Scotland, he graduated in Edinburgh in 1902. He was a licentiate of the R.C.P.&S. In 1904 he came to Canada and practised in the Northwest Territories. He settled in Edmonton where he remained for a number of years. When the Department of Health was established and public health work was being developed, he was appointed Provincial Health Officer. After a number of years he returned to private practice at Whitecourt. The sympathy of the profession goes out to the widow in her bereavement.

Dr. L. Ernest Belanger died suddenly at St. Benoit, Que., on November 12, 1942, in his 61st year. He was born in Montreal on July 5, 1882. After completing his studies at the St. Jerome primary school, he followed his classical course at the Ste. Therèse Seminary. He completed his medical studies at the University of Montreal. Admitted to the practice of medicine in 1909, he practised in St. Eustache and came to Montreal in 1912.

Dr. Arthur Birt, of Halifax, died at Wolfville, N.S., on November 19, 1942, after a long illness, in his seventy-seventh year. Dr. Birt was a native of England and an honour graduate of Edinburgh University in 1887, with the degrees of M.B., C.M. Returning to Edinburgh some years later he took his Doctorate of Medicine in 1898.

Dr. Birt spent his earlier years of practice on the staff of an English mental hospital, and as a ship's surgeon. His mother was one of the founders of the Liverpool Sheltering Home, an organization that had representatives in Canada, and it was while accompanying her on a trip to this side of the Atlantic that he decided to practice in Halifax. Dr. Birt enjoyed a wide reputation as a medical consultant. He was a great student to his latest years and nature had endowed him with the gift of remembering all he read, so that he could quote with ease and accuracy from medical journals a quarter of a century back. His clinics on Thomsen's disease, in which he played the dual rôle of patient and teacher, for he suffered from the disease himself, will be long remembered by his students. On the other hand, the thoracic aneurysm which he diagnosed himself and nursed in his breast for fifteen years with the interest he might have bestowed upon a baby, proved, at his death to be non-existent. He died from a condition of which, because it was a new clinical concept, he knew little, a chronic subdural hæmatoma.

J. de L. Bourgeois, Surgeon Lieutenant, R.C.N.V.R., is listed as missing and presumed killed in recent naval operations according to official news received by his father Dr. B. G. Bourgeois, surgeon-in-chief of Notre Dame Hospital. He was 29 years of age.

Educated at Jean de Brebeuf and Loyola College, he graduated from the faculty of medicine, University of Montreal, in May, 1939, with the highest honours. Entering Notre Dame Hospital as a house surgeon he successfully passed the primary examinations for entry into the Royal College of Surgeons of Canada whereupon he was admitted to the University of Toronto to study for the degree of "Master in Surgery of the University of Toronto".

In December, 1940, Lieutenant Bourgeois was granted leave of absence in order to serve in the Royal Canadian Navy and was transferred later to the Royal Navy, where he was serving as medical officer on a British cruiser.

Dr. Edward James Broderick died at his home in Saint John on December 1, 1942, after a rather long period of indifferent health. Dr. Broderick was born in Fredericton in 1866; his parents were natives of County Kildare, Ireland. His mother was a cousin of the late D'Arcy McGee. Dr. Broderick was educated at schools of Fredericton, University of New Brunswick, from which he obtained his B.A. degree in 1886. He graduated from McGill University in medicine in 1890. He has been continually in practice in Saint John since that time.

Dr. William Hallett Cole died at his home in New Germany, N.S., on December 2, 1942. He was 87 years of age. For thirty-two years he had served the people of New Germany and the wide surrounding country.

Dr. Cole was a native of Mill Village, N.S. In 1883 he graduated from Bowdoin Medical College in Maine. Following postgraduate study in New York, he returned to Nova Scotia, practising for some years at Caledonia. From there he moved to Boston and, later, to Calgary. Coming again to Nova Scotia he worked for a time in Springfield. In 1910 he moved to New Germany where he served till a short time before his death.

Dr. Harry Raymond Fleming passed away suddenly at his home in Humboldt on November 5, 1942, following a period of poor health for several months.

Dr. Fleming was born on October 24, 1894, at Amherst Island, Ontario, the son of William James Fleming, of Irish-Canadian descent. He received his early education at the Amherst Island Public School, later attending St. Mary's Separate School at Kingston, Ont., and Regiopolis College of the same city. He next studied at Queen's University, Kingston, and graduated as M.A., in 1916, after having specialized in political science and history, in which he graduated with high honours. He came to Humboldt as principal of the high school for the term 1917-19. After two years he resigned and returned to Queen's to study medicine, graduating in 1922 with honours.

He then returned to Humboldt, where he has practised since. He married Miss Claire Kyte, daughter of G. W. Kyte of St. Peter's, N.S., and is survived by his widow and four children.

Dr. Fleming took an active part in politics, being a member of the Liberal Party. He was first elected to the House of Commons at the general elections of 1935, and was re-elected in 1940. He was a Fourth Degree member of the Knights of Columbus.

Many messages of condolence came to Mrs. Fleming and family from nearly every Province. Prime Minister Mackenzie King stated in a wire, "Dr. Fleming will be much missed in our House of Commons. His passing will be deeply felt by his many friends in all parts of Canada".

Dr. William Gibson, of Kingston, Ont., died on October 2, 1942. He was born in 1878 and a graduate of Queen's University (1904).

Dr. Lewis Hartley, of Oshawa, Ont., died on September 25, 1942. He was born in 1901 and a graduate of the University of Toronto (1928).

Dr. Retta Gifford Kilborn for forty years a medical missionary in West China, and widow of Dr. O. L. Kilborn, died recently at her home in Toronto. She was 78 years old and had been in ill health for some time. She served originally under the Women's Missionary Society of the Methodist Church and latterly of the United Church.

Born in Meaford, Ont., Dr. Kilborn graduated in medicine from the University of Toronto in 1891. After two years' practice in Owen Sound, she went to West China. In 1894 she was married to Dr. O. L. Kilborn, but continued her medical work. Following the death of her husband in 1920, she returned to service under the W.M.S. She had been retired since 1933.

She was a member of Trinity United Church and since her retirement from service on the foreign field had been active in the work of the W.M.S. in Toronto.

Surviving are two sons, Dr. Leslie G. Kilborn, dean of medicine, West China University, and Kenneth Kilborn, of Schumacher, Ont., and two daughters, Mrs. L. C. Walmsley, a missionary in West China, and Miss Cora Kilborn, former missionary in West China, and at present in Toronto.

Dr. R. K. Knowles, of Vegreville, passed away on November 16, 1942, at the age of 65. He was born at Middleton, N.S., and as a lad went to Boston, where after his preliminary education he attended Harvard University and received his M.D. degree in 1902. In 1913 he registered in Alberta and commenced practice in Entwistle, but shortly afterward moved to Vulcan where he practised until 1919 when he sold out to Dr. Carson. He then moved to Vegreville where he remained until his death. He had specialized in eye, ear, nose and throat work and was a most genial person to deal with. He had a host of friends. He leaves to mourn his loss his widow, a son, Sr. Lt. Robert C. Knowles, U.S. Naval Air Force, in California and one daughter, Charlotte, in Vegreville.

Dr. Brown Loring, an eye surgeon until his retirement earlier this year, died of a heart attack on November 6, 1942, at the age of 83.

Dr. Loring, who for a number of years served as an Assistant Professor of Clinical Ophthalmology at the University of Illinois, graduated in 1883 from McGill University and took postgraduate work at the Royal College of Surgeons in London.

Surviving are a daughter and a grandson.

Dr. Freeman S. Messenger, of Middleton, N.S., died at his home on November 24, 1942, after a lengthy illness. Dr. Messenger was a prominent figure in political and community life for many years, as well as in medical circles. He was 76 years of age.

Born at Tupperville, N.S., Dr. Messenger received his early education at Horton Academy and Acadia University which gave him a degree in Arts. In 1893 he graduated in medicine from the University of New York, and set up practice in Petite Riviere. In 1911, he left Nova Scotia's South Shore for the Annapolis Valley, and settled in Middleton. During his many years of service there Dr. Messenger took an active interest in all communal problems. Through two terms he served as mayor, and for many years was a member of the town council. He was coroner for Annapolis county and a member of the Provincial Medical Board. Dr. Carl Messenger carries on his father's practice.

Dr. Alexander Murray, of Lord's Cove, Deer Island, died in December at his home. Dr. Murray was born at Loganville, N.S., March, 1858, educated at Pictou Academy and Jefferson Medical College from which he graduated in 1892. Following postgraduate work in Chicago, Dr. Murray practised in Deer Island for half a century. He was interested in all local enterprises, especially the local telephone company and in the industry of weir-fishing.

Dr. Alexander Fraser Pirie, of Dundas, Ont., died on November 24, 1942. He was a graduate of Queen's University (1878).

John Edmond Powell, Surgeon-Lieutenant of the Royal Navy is missing and presumed dead after naval operations overseas, according to official notification by his father Dr. R. Powell, of Montreal. A native of Montreal, John Edmond Powell who was 25 years old received his education at St. Andrew's School, Selwyn House and McGill University, where he graduated in medicine. He was a member of the Delta Upsilon fraternity. A noted swimmer and skier, he

was a member of the McGill swimming and skiing teams. He had been an intern at the Montreal General Hospital for a year before he enlisted in the Royal Canadian Navy in 1940. He was transferred to the Royal Navy last September.

Dr. Lucien Ranger, a well known Montreal physician attached to Ste. Jeanne d'Arc Hospital, died on November 14, 1942, in his 50th year after an illness of five months.

After serving in the Great War as a lieutenant in an infantry regiment, Dr. Ranger graduated from the University of Montreal in 1919, and afterward did postgraduate work at the University of Colorado.

He had practised in Montreal for the past 12 years and was widely known for his work in silicosis and tuberculosis, in which he specialized.

Besides his widow, formerly Miss Agnes MacKenzie, he is survived by three brothers, Lieut.-Col. Emile Ranger, Lieut-Col. Paul Ranger, officer commanding the C.O.T.C. of the University of Montreal, and Oscar Ranger, and a sister, Mrs. B. Bergeron.

Dr. John Morrow Robb, former Minister of Health in the Henry Government, died on December 11, 1942, at his home at Blind River, Ont., after an illness of only one week. He was 65 years of age. Widely known throughout the north country, Dr. Robb's death came as a shock to hundreds of residents, many of whom had seen him a few weeks ago, apparently in his usual health.

Dr. Robb represented Algoma in the Ontario Legislature, and was an efficient Minister of Health, having been instrumental in bringing about important changes in the operations of the department. He was keenly interested in all phases of public health and built a hospital in Blind River. On becoming Health Minister he turned the hospital over to the Canadian Red Cross to be operated by them.

Born in Downie Township, Perth County, Dr. Robb attended public and high schools in Stratford and later attended the University of Toronto, graduating in 1903. He taught school in Middlesex County for three years, and in 1915 was elected by acclamation to the Legislature. He was defeated in the elections of 1919 and 1923, but was returned in the subsequent elections of 1926 and 1929, entering the Cabinet in 1930. In 1938, after retiring from Provincial politics, he was appointed organizer for the National Conservative Party.

A man of strong sympathy for the underdog, Dr. Robb brought the benefits of medicine to rough and lonely sections of Northern Ontario. His hospital was the only institution of its kind within a radius of 40 miles. He served on the Board of Education at Blind River and also as Medical Officer of Health for more than 20 years.

Surviving members of his family are his widow and two sons, John at home, and William, Toronto.

Dr. Louis Joseph Sebert, a well-known Toronto surgeon and oculist, head of the Department of Ophthalmology at St. Michael's Hospital, died at the hospital on December 2, 1942, following an illness of two months, aged fifty-six.

Previous to heading the department at St. Michael's, he was on the staff of the Hospital for Sick Children for many years. He was a consultant at St. Joseph's Hospital since it was founded in 1921.

Born in Whitby he received his education at Brooklin School and Whitby Collegiate. In 1911 he graduated from the Faculty of Medicine, University of Toronto.

During his years at the university, he starred in track athletics. In 1908 he represented Canada at the Olympic Games at London, England. From 1911 until 1912 he was an intern at St. Michael's Hospital and the following year went to New York and Vienna to do postgraduate work. On his return he was appointed to the staff of St. Michael's and remained on it until his death.

In 1928 Dr. Sebert was elected to the Toronto Board of Education, representing the Separate Schools. He is survived by his mother, his widow, and three sons and one daughter.

Dr. Henry Ernest Tremayne, of Victoria, B.C., died on July 3, 1942. He was born in 1873 and a graduate of Trinity University (1895).

We learn, as we go to press, that Dr. Jabez H. Elliott, of Toronto, died suddenly on December 18th. Extended notice will appear in our next issue.

News Items

Alberta

A special meeting of the College of Physicians and Surgeons of Alberta was held on November 18, 1942, when the question of granting interim licenses to men in the forces was considered. The Registrar was authorized to issue interim licenses to qualified medical men in the forces in districts where no local registrants were available.

The head of the Cancer Service has submitted a list of fees to be paid for the various types of cancer surgery, when in the opinion of the diagnostic clinics such operations should be performed. If however, the case is found not to have been cancer the Government will not pay for the operation.

The Federal Government Department of Health occasionally puts men on a restricted list when it is convinced that the physicians are prescribing or using narcotics in excess. The question has been raised in Alberta, that in order to help the Department at Ottawa the Provincial Registrar should be advised, so that the local councils could take some steps to curb the abuse, by dealing with the men on the restricted list. It is felt that when a man transfers from one province to another this information should be available to the registrar of the province where a man goes.

Municipalities are making contracts with hospitals outside their districts, whereby they pay the hospital 75c. per day for every patient from their municipality; this sum to cover all its responsibility, thus no accounts are to be sent back to it. On the other hand, the hospital is free to collect accounts for all patients that come in. It has been found that municipalities take advantage of this arrangement to avoid paying for the services of physicians. It is felt that some fund should be created from the municipality so that physicians might have some remuneration from the patients sent in.

The Council decided to issue a further protest against the action of the Provincial Government Life Insurance Department in refusing to pay a reasonable fee for a thorough examination. It is felt that for the type of examination required, a $5.00 fee is justified.

Council elections are on again this year, in the following constituencies—No. 2 Lethbridge, No. 4 Camrose and No. 6 Calgary. As Dr. Francis and Dr. Lamb have withdrawn in districts No. 4 and No. 6, there will be at least two new men on the council this year. Dr. L. M. Rogers has been elected by acclamation for Camrose district.

Of the fifteen "doctors" of osteopathy who have been registered in Alberta, only five are in practice here, four of them in Edmonton and one in Calgary.

Since the organization of the Faculty of Medicine, Alberta University, 29 women have graduated, only 6 of whom are in practice in this province.

G. E. LEARMONTH

British Columbia

We receive letters periodically from British Columbia members of the profession on active service. One man from Vancouver, Captain Reginald R. Laird took part in the expedition to Dieppe. He writes from a Kriegsgefangenenlager on October 18th to say that he is safe but has lost his right leg. Captain Laird has a particularly gallant record, as, though wounded, he stayed to the end, tearing off his own clothes to make bandages and dressings for the wounded.

The Victoria Medical Society held its annual dinner at the Empress Hotel on November 28th with representatives present from the Services and the various other medical associations in the Province.

Lieut.-Col. H. A. DesBrisay, R.C.A.M.C., who spent many months overseas, read a paper recently on "Medicine and the War" for the Vancouver Medical Association. His intimate knowledge of War Medicine made this a very interesting paper.

Some time ago we referred to the controversy over the chlorination of the Vancouver water supply. This has been settled as between the Dominion Government and the Greater Vancouver Water Board by the undertaking of the former to assume this as a war measure and its promise that the city will be permitted to terminate chlorination after the war is over.

Dr. G. F. Strong, Chairman of the Committee on Economics of the British Columbia Medical Association, is now in Ottawa on business of the Association.

Colonel Gordon C. Kenning of Victoria, who was in Command of No. 16 General Hospital in Great Britain, has returned to Canada.

The annual report of the Medical Health Officer of Greater Vancouver contains some significant figures. The infant mortality of the City of Vancouver for 1941 shows a rate per thousand live births of 26.95. This is 2.7%, which is an extremely low index. It is, as a matter of fact, the lowest of any city in Canada, and compares favourably with the best world statistics. The figures on maternal mortality are even better; giving a maternal mortality rate of 1.48 per thousand live births. The reports of the work of clinics, pre-natal, post-natal, mental hygiene, etc., are very encouraging. The statistics given apply, of course, only to the white population as the figures for Orientals are higher.

The Indian village of Port Simpson, B.C., has marked, in 1942, the fiftieth milestone in the history of its United Church Hospital. For the three days of the celebration, the village flags were flying.

This missionary hospital began its work in 1892 through the appeal of Dr. Thos. Crosby. Dr. A. E. Bolton volunteered to go to Port Simpson at his own expense to undertake much needed work in the village, at a time when there was no doctor between Vancouver and Port Simpson, a distance of over 600 miles.

This hospital is of interest to Toronto and Ontario men in that, within a few years, Dr. R. W. Large (Toronto, 1897) took over and extended the work. His widow, Mrs. R. W. Large, was present at the celebration.

The present Superintendent is Dr. G. W. Fiddes. The hospital is usually filled to capacity. Much time is given to the development of craftsmanship, woodwork, and other hobbies.

In connection with the celebrations, there was a baby show. The opportunity was also taken to put on a tuberculosis and health display, together with moving pictures which provided visual health instruction of a very helpful nature. The Prince Rupert Medical Association telegraphed its congratulations, as did the chairman of the Hospital Board, Dr. R. Geddes Large, and Dr. W. T. Kergin.

J. H. MACDERMOT

Manitoba

Manitoba physicians are gratified over the appointment of Dr. J. D. Adamson, Professor of Medicine, and Dr. G. S. Fahrni, Assistant Professor of Surgery, as consultants in medicine and surgery respectively in the Royal Canadian Army Medical Corps. It is understood that their responsibilities will extend to the four western military districts, Nos. 10, 11, 12, and 13. Both are deservedly popular with their confrères, who feel that they will fill their new positions with distinction.

Deer Lodge Military Hospital is being enlarged by the construction of service extensions including connecting corridor and a new pumping plant.

A strong committee of medical men is engaged in arranging final details in connection with the administration of Manitoba Medical Service a scheme for surgical and medical health insurance endorsed by the Manitoba Medical Association.

ROSS MITCHELL

New Brunswick

The regular monthly meeting of the Saint John Medical Society was held in the Admiral Beatty Hotel on November 19th. The meeting took the form of a complimentary dinner to Surgeon-Lieut. A. W. Clark, one of the members of the Society who has distinguished himself in the Naval Service in this war and has been awarded the D.S.C. A large number of members were in attendance and listened with interest to the remarks of the guest of honour in describing medical practice in the Navy, and at naval depots. The president of the society, Dr. H. A. Farris, presented the guest of honour with a suitably engraved silver tray.

Dr. S. R. D. Hewitt, superintendent of the Saint John General Hospital, for the past eleven years has been granted a year's leave of absence by the commissioners of the Saint John General Hospital. The leave of absence was necessary due to continued ill health.

Major Austin Clark, Medical Officer of Saint John City and district, has joined the R.C.A.M.C. in M.D. No. 7.

Dr. C. Rosenhek, of Campbellton, has joined the R.C.A.M.C. and is stationed in a Military Hospital in New Brunswick.

A. STANLEY KIRKLAND

Nova Scotia

Lieutenant-Colonel Henry Ernest Kendall, M.D., of Windsor, N.S., was sworn in as Nova Scotia's new Lieutenant-Governor in the Red Chamber of Province House. The oath was administered by Sir Joseph Chisholm, Chief Justice of Nova Scotia. The beautiful old Georgian chamber was a colourful background for the historic ceremony. Mrs. Kendall, seated beside her husband on the dais, was a charming first lady.

Blood serum banks are planned for Bridgewater and Amherst.

Having lost Dr. Robert Wright to Elmsdale, Maitland, seething with war activities and doctorless, is pleading with the provincial health officer for medical aid.

Having cancelled its course for the second year, because of war-time restrictions, the Dalhousie Refresher Course Committee has offered to send its lecturers around the province, as requested, to local society meetings. Several Dalhousie teachers have presented talks and the spirit of the Course is thus kept alive to the time when it can be restored to its old form at the University.

ARTHUR L. MURPHY

Ontario

Honour for Lieutenant-Colonel D. P. Kappele, D.S.O.—On November 11th last the Hamilton Academy of Medicine conferred a Life Membership (*Honoris Causa*) on Lieutenant-Colonel D. P. Kappele, D.S.O. (and bar), V.D. In presenting Colonel Kappele for this honour Dr. W. J. Deadman briefly described his long and brilliant career in the service of medicine as well as in the army during the war of 1914-18. His association with the Hamilton Medical Society was particularly noteworthy in its length of duration and his enthusiastic support. He had been successively its secretary, vice-president, and president. He had also been connected with special scientific clubs of the city.

Dr. Deadman recalled many incidents of Colonel Kappele's life in illustration of his outstanding personal attributes, his guiding principle being the phrase he himself used, "*noblesse oblige*". He possessed a fairness of mind, a balance of judgment, and a loyalty to friends and country which was of unfailing influence amongst his associates.

To honour the fifty-first birthday anniversary of Sir Frederick Banting, the Chancellor and President of the University of Toronto, together with many of the University Staff, accompanied Lady Banting to Mount Pleasant Cemetery to place a wreath upon Sir Frederick's tomb. This may become an annual ceremony.

Captain Clarence Reginald Rapp, (Toronto, 1931), of the R.C.A.M.C. on duty overseas, has been made a Fellow of the Royal College of Surgeons, London. Following graduate work in Toronto, he joined the Staff of Cambridge University where he received an Honorary Master of Arts degree and, in August of this year, enlisted in the R.C.A.M.C. in England. He was posted to Headquarters staff in London.

Announcement is made of the appointment by the Ontario Cabinet of Dr. Agnes L. Jamieson as Coroner, serving the district of Haliburton. She is the first woman coroner to be appointed in the Province of Ontario. Dr. Jamieson, with her associate, Dr. Marjorie Mosbaugh, are at the present time the only two doctors in the widespread district of Haliburton, the men formerly in practice there being on army service.

Professor William Boyd, Head of the Department of Pathology in the University of Toronto, addressed the Royal Canadian Institute on November 14th, on the subject—"The life blood". He described what the blood does in the human body and devoted some time to the preservation and use of blood in war medicine and surgery.

On November 28th, the Royal Canadian Institute was addressed by Dr. W. E. Blatz, Professor of Child Psychology and Director of the Institute of Child Study at the University of Toronto. Dr. Blatz has recently returned from England where he was Director of Garrison Lane Nursery Training Centre in Birmingham. He was also a lecturer at the Nursery School Association Summer School in Oxford. He outlined what the Department of Education in Britain is doing for the child. He brought out the point that, through serving meals in schools, the Department of Education is now the biggest restaurant owner in Britain.

That building extension will soon be under way at both the Wellesley Hospital and the Toronto East General Hospital seems certain in that the City Council of Toronto, with the approval of the Municipal Board of Ontario, has granted $150,000 to each of these hospitals for building purposes.

Dr. R. B. McClure, Director of the Friends Ambulance Unit in China writes to say that the transport which he directs is now better organized in spite of the Japanese advance and the loss of petrol and the cutting of the Burma Road. Hampered by lack of fuel, he is getting some alcohol but is depending principally upon charcoal for motor fuel.

We quote from the November number of the *University of Toronto Monthly:*

"Born of the accelerated medical course, the new *Arts and Letters Club* of the Medical Society has become a regular Monday evening feature of campus life this year. It started with a group of medical students who liked to discuss philosophy and last summer grew into a more regularly constituted discussion group which met in the evenings over supper in the Graduates' Dining Room of Hart House.

It arose out of the realization, heightened by the accleration, that the medical course was basically a technical one and left little time for wider cultural aspects. The custom of the Club is to invite a guest speaker who talks briefly on a subject of current interest and then the meeting is thrown open for discussion."

The Honourable Mr. H. J. Kirby, Minister of Health for Ontario, announced in November that so far this year 50,000 individuals have been surveyed for tuberculosis through the work of the Divisions of Tuberculosis Prevention and of Industrial Hygiene. This survey followed because of the results achieved through a survey in December, 1941, of the members of the Ontario Civil Servants. The results of the surveys were much the same. In this latest survey, Mr. Kirby states that it is found that between two and three per thousand would require sanatorium treatment while another four per thousand would require further close observation. Most of this survey was carried out with men and women under war time conditions of industrial employment. A great lesson to the public is stressed through the finding that more than one-half of the persons found with early tuberculosis were not conscious in the slightest degree of being ill. Nor was one of them sick enough to stay at home. Everyone was at work quite unconscious of the fact that he or she was a source of danger to others.

The introduction of the mobile x-ray equipment has made it possible for the Department to survey twice as many persons in Ontario as in any previous year.

A survey is now being made of all health services in Ontario under a Dominion Order-in-Council. There is a distinct shortage of doctors in the rural areas of the Province, some towns and villages being without what is considered adequate service.

Under the auspices of the Procurement and Assignment Board, with its head office in Ottawa, there will be a complete inventory of physicians with regard to age groups, physical fitness, and the areas they cover in their practices. Nursing, public health, and hospital care will be included in the survey.

The duty of the Procurement and Assignment Board has been defined as making sure that there will be an equitable distribution of medical, hospital, and nursing care across the Province at any given time, having regard for the needs of the armed forces both at home and abroad. It has been pointed out that 30% of the doctors in Ontario have enlisted, as compared with 6% of the general public but of this percentage the greater proportion has come from the rural areas. It would seem clear that most future enlistments of doctors must come from city areas. To try to help the situation, the Ontario Medical Association has been operating a placement bureau through which available doctors are placed in centres having the greatest need.

Among recent promotions of the R.C.A.M.C. Officers are the following: Captain F. L. Shipp (Toronto, 1935), to be Major; Major John R. Ross, (Toronto, 1926), to be Lieutenant-Colonel in command of No. 26 Field Ambulance, R.C.A.M.C.; Captain Harold Palmer, (Toronto, 1926), R.C.A.M.C., stationed at Chorley Park, to be Major.

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We are informed that Dr. W. R. Crowe, of Minden, Ontario, prisoner of war, is now in Austria where he serves as medical officer in an internment camp.

Dr. D. W. Clare, R.C.A.M.C., of Port Credit, reported missing after Dieppe, is now reported a prisoner of war in Germany. He has mentioned in a letter home that Dr. Charles Robertson of Toronto East General Hospital is in the camp with him and that they were pretty busy immediately following Dieppe with only three doctors among hundreds of wounded men. They arrived in the prison camp with only the clothing they stood in.

Dr. Howard V. Slemon, son of Dr. and Mrs. C. W. Slemon, Bowmanville, is attached to No. 4 Mobile Neurosurgical Unit, British Army, somewhere in Africa.

The *Alumni Gazette* of the University of Western Ontario lists in the December number, the names of many of their graduates serving with the Medical Department, U.S. Army: Captain Irving Weintaub, '40, with 53rd Coast Artillery, Virginia Beach; Lieut. Phil Luria, '38, of Miami Beach, Florida, is in Alabama; Murray Finkelstein, '40, of Brooklyn, N.Y., is serving in Texas; Lieut. Julien Priver, '40, of New York State Health Department is stationed at Nashville, Tennessee; Lieut. Mort Golden, '40, of Brooklyn, N.Y., a famous champion boxer, is stationed at Robins Field, Georgia.

Dr. T. H. Leggett of Ottawa, Past President of the Canadian Medical Association and Chairman of its Council, has been appointed Surgeon-in-Chief for the Dominion for the St. John's Ambulance Brigade. Dr. W. J. Bell, of Toronto, former Deputy Minister of Health for Ontario, has been appointed Acting Provincial Commissioner of the St. John's Ambulance Brigade in Ontario.

Among the Canadians reported on the diplomatic ship, *Gripsholm*, from China and Japan, was Dr. Gordon Struthers, Toronto, '14, Superintendent of Cheeloo University Hospital in Tsinan, Changtung, Northern China.

The Grenfell Labrador Medical Mission, begun fifty years ago by Dr. Wilfrid Grenfell, is keeping up its admirable work. An attempt is being made to form further groups to undertake work for the Mission. It is so closely associated with the Battle of the Atlantic that the local officials are appealing for new groups of young Canadians to take up the challenge. For many years, the Academy of Medicine, Toronto, has sent instruments and medical supplies from time to time. Mrs. W. L. Holman, the local secretary, and Mrs. John Oille, convener of clothing for the local branch, are appealing for further supplies to aid and alleviate the hardships of the natives and the fishermen of Labrador.

The City Council of Toronto has voted to have a survey of the Toronto Public Health Department to be conducted by the Provincial Department of Health assisted by representatives from the Academy of Medicine and the School of Hygiene of the University of Toronto. Toronto has had a proud record in the matter of public health. The Council and Health Officer seem anxious that everything possible should be done to maintain its high standards.

The Ontario Division of the Canadian Red Cross Society announces that they have been presented, by the *Canadian Tribune*, with the first of two mobile blood donor units. These have been presented in memory of the late Dr. Norman Bethune, a Canadian physician and surgeon, who may, perhaps, be given the credit of first introducing the blood bank in treating wounded soldiers. It will be recalled that Dr. Bethune went to Spain in 1936 and, during the civil war there, established the famous Madrid Blood Transportation Service (B.T.S.). Early in 1938 he went to China where he died from blood poisoning caused from an injury while operating.

J. H. ELLIOTT

Quebec

Announcement has been made of the appointment of Dr. L. C. Simard, anatomo-pathologist of Notre Dame Hospital, as a member of the medical council of the National Research Council of Canada.

Dr. Simard, who is well known in local medical and academic circles, is also a professor of the faculty of medicine at the University of Montreal.

Dr. Grant Fleming has been called to Ottawa to arrange details of a preventive medicine branch in the Department of National Defence. It is understood that he will first make a survey of the situation, to see if any remedy can be devised to lessen the number of defects which develop in army recruits after they begin their army training.

Dr. Fleming is the medical director of the Bell Telephone Company of Canada, and has been granted leave of absence to carry out his new military duties.

In the last great War, Dr. Fleming served with the R.C.A.M.C. in France, was awarded the Military Cross, and for a time was assistant to the Consultant, Canadian Forces, in hygiene and sanitation services in London.

The Canadian Nutrition Program. — The Federal Government, as a war measure, is developing a campaign on nutrition. The main point is to inform the public as to the principles which should guide them in choosing and preparing their food. The organization for carrying out this work is very extensive and thorough. Each Province has a committee, and under this there function various local committees in the large centres.

The program to be carried out in the Montreal area is in the hands of a committee headed by Dr. Ad. Groulx, director of the Health Service of Montreal aided by members drawn from various groups, such as the Universities, the Red Cross and the College of Physicians and Surgeons.

All the recognized methods of public instruction will be used, folders, lectures, radio talks, articles in the newspapers, and exhibits. Medical and dental societies are being asked to collaborate, as well as clubs, schools, shops and the movies.

We most heartily endorse these efforts and wish them every success.

Le Dr A. R. Foley, directeur de la Division des maladies contagieuses donne aux parents des conseils importants à propos des soins qu'ils doivent donner à leurs enfants. Voici comment s'exprime le Dr Foley: "Il est d'une prudence élémentaire de séparer une personne malade d'avec celles qui sont en santé, tant qu'un diagnostic n'est pas posé, établissant si la maladie est ou n'est pas contagieuse, et dans le cas où il y a contagion, aussi longtemps que le danger de propagation existe. La vieille rengaine que les enfants doivent avoir toutes les maladies contagieuses a tué plus de personnes chez nous que toutes les guerres, tous les accidents et tous les cataclysmes réunis ensemble depuis la fondation de Québec; c'est une excuse commode pour cacher notre apathie, couvrir notre négligence, céler nos manquements à notre devoir d'état envers nos enfants. Les parents ont en justice, de même qu'en charité, l'obligation de protéger la santé et la vie de leurs enfants au même titre que celle de leur assurer la nourriture, le vêtement et l'instruction. L'enfant ne sait pas comment se protéger, il ne sait pas comment protéger les autres: c'est aux parents qu'il appartient de le faire à leur place et de leur enseigner comment procéder pour obtenir cette protection. L'enfant a également droit aux soins médicaux lorsqu'il est malade. . . ." Et le Dr Foley insiste encore sur la nécessité d'appeler le médecin à temps, et mieux encore, sur l'obligation morale de faire immuniser tous les enfants contre les maladies contagieuses, notamment contre la diphtérie.

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Saskatchewan

On the invitation of the Medical Staff of No. 4 S.F.T.S. through Flight Lieutenant G. C. Bradley, the members of the Saskatoon and District Medical Society were entertained at the Hospital and in the Officers' Mess on the evening of November 13, 1942.

Films were shown and Flight Lieutenant F. Werthenbach and Squadron Leader S. L. Lapin presented interesting papers on the medical examination hurdles that recruits have to take and also outlined some of the reasons why certain recruits are turned down. Mention was also made of some of the intangible and difficult-to-measure factors which go into the making of a successful candidate for air crew.

Refreshments were served at the close, in the Officers' Mess. Impression of the civilian doctors was that the medical work in the air school was now well organized and the medical officers were certainly on their toes.

H. D. HART

General

Royal College of Physicians of Edinburgh. — A Quarterly Meeting of the College was held on November 3rd, the President, Dr. Charles McNeil, in the chair. Dr. Wm. George Clark (Edinburgh) was introduced and took his seat as a Fellow of the College. Dr. P. A. H. King, D.F.C. (London), Dr. J. G. Sclater (Edinburgh), Dr. Adam Patrick (Dundee) and Dr. J. W. McNee, D.S.O. (Glasgow), were elected Fellows of the College.

The Hill Pattison-Struthers Bursary in Anatomy and Physiology was awarded to Mr. A. Jardine Neil.

American Board of Obstetrics and Gynecology.— The next written examination and review of case histories (Part I) for all candidates will be held in various cities of the United States and Canada on Saturday, February 13, 1943, at 2.00 p.m.

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

The Board of Regents of the **American College of Physicians** has announced the cancellation of their 1943 Annual Session, which was scheduled to be held in Philadelphia, April 13 to 16, 1943.

The American Urological Association offers an annual award "not to exceed $500" for an essay (or essays) on the result of some specific clinical or laboratory research in urology. The amount of the prize is based on the merits of the work presented, and if the Committee on Scientific Research deem none of the offerings worthy, no award will be made. Competitors shall be limited to residents in urology in recognized hospitals and to urologists who have been in such specific practice for not more than five years.

The selected essay (or essays) will appear on the program of the forthcoming meeting of the American Urological Association, May 31 to June 3, 1943, Hotel Jefferson, St. Louis, Missouri.

Essays must be in the hands of the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee, on or before March 1, 1943.

[We consider it well worth while to reprint from the *Journal of the American Medical Association* (1942, **120:** 55) the following statement regarding care of expectant mothers employed in industry. ED.]

Standards for Maternity Care and Employment of Mothers in Industry

Prepared by the Children's Bureau and the Women's Bureau of the U.S. Department of Labour in consultation with a group of representative medical men and women in industry.

GENERAL STATEMENT

With increased employment of women in industry, the problem of protection of the pregnant woman and her child has become more urgent. Many inquiries have come to the Women's Bureau and to the Children's Bureau from a variety of sources, such as employers, workers and health departments, concerning the types of work suitable for pregnant women and the policy of maternity leave. The labour situation in this country does not necessitate the recruitment or employment of pregnant women or women with infants. A woman who is expecting a child should give first consideration to her own health and to plans for safeguarding the health and care of the child. Because some women who are pregnant or who have young children may find it necessary to work, the following statement of policy has been formulated to serve as a working basis for those concerned with this problem. It is recognized as a general policy that provisions for maternity care and leave should not jeopardize the woman's job or her seniority privileges.

EMPLOYMENT POLICIES AND CARE FOR PREGNANT WOMEN

These recommendations are based on the premise that, to safeguard the pregnant woman who works, certain special provisions should be made. She should have opportunity for adequate antepartum care. She needs sufficient time off before delivery to allow her to be in a rested state at the time of delivery and to prevent undue strain in the latter part of pregnancy. If she is employed in certain occupations that involve hazards or strain, or if complications of pregnancy occur, she needs special consideration. It is not possible to day down hard and fast rules that will fit every situation. The wide variation in general physical condition and in the amount of home duties performed outside working hours necessitates some individualization of arrangements for maternity leave and protection.

The following general recommendations are made as a guide:

1. Facilities for adequate antepartum medical care should be readily available for all employed pregnant women, and arrangements should be made by those responsible for providing antepartum care so that every woman will have access to such care. Local health departments should make available to industrial plants the services of antepartum clinics; and the personnel management or physicians and nurses within the plant should make available to employees information about the importance of such services and where they can be obtained.

2. Pregnant women should not be employed on a shift including the hours between 12 midnight and 6 a.m. Pregnant women should not be employed more than eight hours a day or more than forty-eight hours a week, and it is desirable that their hours of work be limited to not more than forty hours a week.

3. Every woman, especially a pregnant woman, should have at least two ten minute rest periods during her work shift, for which adequate facilities for resting and an opportunity for securing nourishing food should be provided.

4. It is not considered desirable for pregnant women to be employed in the following types of occupation, and they should, if possible, be transferred to lighter and more sedentary work: (*a*) Occupations that involve heavy lifting or other heavy work. (*b*) Occupations involving continuous standing and moving about.

5. Pregnant women should not be employed in the following types of work during any period of pregnancy but should be transferred to less hazardous types of work. (*a*) Occupations that require a good sense of bodily balance, such as work performed on scaffolds or stepladders, and occupations in which the accident risk is characterized by accidents causing severe injury, such as operation of punch presses, power driven woodworking machines or other machines having a point of operation hazard. (*b*) Occupations involving exposure to toxic substances considered to be extra hazardous during pregnancy, such as: aniline, benzene and toluene, carbon disulfide, carbon monoxide, chlorinated hydrocarbons, lead and its compounds, mercury and its compounds, nitrobenzene and other nitrocompounds of benzene and

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its homologues, phosphorus, radioactive substances and x-rays, turpentine, other toxic substances that exert an injurious effect on the blood forming organs, the liver or the kidneys.

Because these substances may exert a harmful influence on the course of pregnancy, may lead to its premature termination or may injure the fetus, the maintenance of air concentrations within the so-called maximum permissible limits of state codes is not, in itself, sufficient assurance of a safe working condition for the pregnant woman. Pregnant women should be transferred from workrooms in which any of these substances are used or produced in any significant quantity.

6. A minimum of six weeks' leave before delivery should be granted, on presentation of a medical certificate of the expected date of confinement.

7. At any time during pregnancy a woman should be granted a reasonable amount of additional leave on presentation of a certificate from the attending physician to the effect that complications of pregnancy have made continuing employment prejudicial to her health or to the health of the child.

EMPLOYMENT POLICIES AND CARE FOR THE MOTHER AND INFANT AFTER DELIVERY

To safeguard the mother's health she should be granted sufficient time off after delivery to return to normal and to regain her strength. The infant needs her care, especially during the first year of life. If it is essential that she return to work, the following recommendations are made:

1. All women should be granted an extension of at least two months' leave of absence after delivery.

2. Should complications of delivery or of the postpartum period develop, a woman should be granted a reasonable amount of additional leave beyond two months following delivery, on presentation of a certificate to this effect from the attending physician.

Book Reviews

Osler's Principles and Practice of Medicine. H. A. Christian. 14th ed. (semicentennial), 1475 pp. $9.50. Appleton-Century, New York, N.Y., 1942.

More than one famous textbook in medicine has reached the point at which it has changed so much as to be unrecognizable in comparison with its original. That is inevitable. Change and decay are bound to be. The question always is, how well does the book keep up with the changes and so resist its decay? In the case of "Osler" one looks also to see how much of Osler's personality it has been possible to retain. No other textbook of medicine has ever reflected the author's personality so completely. It cannot be said that the present revision has obliterated all traces of Osler himself, but whilst the hand in many places is that of Esau the voice is quite evidently that of Jacob. This, however, is not an important criticism. As a modern textbook this volume still holds its high place. Professor Christian brings all his wealth of clinical experience to the task. His therapeutic outlook would not offend the most conservative, whilst the more enthusiastic would find it hard to ask for more innovations. It is well said in the Preface that "the new has been added only after experience has seemed to indicate that it is worth while". No new advance has been overlooked, and the student may feel that he has in this newest edition a sound and comprehensive guide to the study of medicine.

First Aid and the Medical Practitioner. Edited by H. Rolleston and A. Moncrieff. 95 pp., illust. The Practitioner, 5 Bentinck St., W.1, London, England, 1942.

This book is a collection of papers on various aspects of first aid. The growing number of such publications is highly significant. Too many medical men know too little about first aid. It is well that we should have such contributions to the subject by men well qualified to speak not only for the profession but for the first-aid aspect of treatment. Perhaps nothing else has been more apparent in the accounts of first-aid work in England in this war than that first-aid parties should have a medical man to work with them for the sorting out of cases. This point is emphasized.

We would highly recommend this little volume for its practical, well arranged instruction. There is naturally much in it that is elementary, but it also contains extremely useful hints for the medical man. It is always a little disturbing to have a first aider make suggestions which had not occurred to the medical man, a situation quite likely to occur when the latter has never taken any part in first aid. This book will help in meeting such a need.

Changes in the Knee Joint at Various Ages. G. A. Bennett, H. Waine and W. Bauer. 161 pp., illust. $2.50. Commonwealth Fund, 41 East 57th St., New York, N.Y., 1942.

This monograph represents a macro- and microscopic study of the changes in the knee joints of 63 persons ranging in age from one month to 90 years. The investigation was carried out to ascertain the changes at various ages. The material demonstrates that degenerative changes begin as early as the second decade and increase in direct ratio with the time-factor. Some joints, however, are more markedly involved than others in the same decade. Further the macroscopic and microscopic changes are far in excess of the x-ray findings.

The fundamental change is a degenerative process of hyaline cartilage, varying to a certain degree with the hereditary endowment of each individual. The influence of mechanical stress and strain also must be included.

This work is well presented with excellent bibliography and illustrations of the macro- and microscopic preparations. It should be of value in enabling the medical man to base his treatment on pathological findings in this common condition, *i.e.*, degenerative or osteoarthritis of the knee joint. Further, the changes can also be surmised for the other joints of the body.

The Surgery of Pancreatic Tumours. A. Brunschwig. 421 pp., illust. $8.75. McAinsh, Toronto, 1942.

The medical profession will welcome this comprehensive monograph on pancreatic tumours, which are beginning to feel the impact of surgical intervention. The work is presented in classical manner, with sections on the History of the Subject, the Anatomical and Physiological Considerations, and Experimental Pancreatic Surgery, followed by chapters on Cysts, Benign and Malignant Tumours with their respective clinical syndromes and surgical treatment. As the author states in his preface, the two important advances in the treatment of pancreatic disorders are the surgical removal of (*a*) benign tumours, especially those more associated with hyperinsulinism, and (*b*) carcinoma of the pancreatic head, the removal of which will allow clinical investigation of patients deprived of the external pancreatic secretion. One of the most valuable features is the collection of recorded case histories from the literature illustrating particular aspects of pancreatic surgery.

This treatise may be regarded as a milestone in the literature on pancreatic disorders. It is more than the medical student and general practitioner require, but it will be a book for the abdominal surgeon to read and place on the book shelf for repeated reference.

Traumatic Surgery of the Jaws. K. H. Thoma. 315 pp., illust. $7.00. McAinsh & Co., Toronto, 1942.

This is a very useful contribution to the literature at this time. This book, written primarily for the dentist and oral surgeon, should also be welcomed by the medical profession, for in this global war the civilian is almost as liable to become a casualty as the soldier, and trained specialists are not always available.

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Emphasis has been placed upon early reduction and splinting as soon as the patient's general condition permits.

The usual appliances used in fractures of the jaws are described. A new feature is the inclusion of extra-oral skeletal fixation for certain fractures of the mandible. This procedure has been used mainly in England. However, it is to be hoped that enthusiasts will not discredit this method by employing it in cases where a simple appliance would suffice.

The chapter on traumatic injuries of the condyle and mandibular joint is excellent, as is that on complications and deformities.

It is a most practical, concise and well-timed text.

A Manual for the Differential Diagnosis of Oral Lesions. J. L. Bernier. 228 pp., illust. $4.75. McAinsh & Co., Toronto, 1042.

"Differential Diagnosis of Oral Lesions" is a handy reference book of oral pathology for both the dental student and practitioner. Most of the pathological conditions of the oral cavity have been included, with excellent histo-pathological illustrations and photographs of clinical material. In general, clinical diagnosis and treatment might have been treated somewhat more fully.

The chapter on malignant tumours of the oral region merits special attention, for it is the dental practitioner who has both the opportunity and responsibility of diagnosing these lesions in the earliest stage. The chapter on cysts of the oral regions is also well done.

This book is a concise text and useful addition to the office and school library.

The Pathology of Trauma. A. R. Moritz. 386 pp. $6.90. Lea & Febiger, Philadelpha, 1942.

One gets a feeling as this book is studied that it was written to *help* the reader who might be a general practitioner. In the first part of the book, definite answers are given to many questions that a doctor will be asked by a jury at an inquest. There is enough explanation, without being too detailed, on the relationship of trauma to subsequent reactions of the body, infection, healing, tumours, etc., and to various causative agents.

Each organ is dealt with as a unit and a definite picture is drawn, both as it is seen at autopsy and in the section of tissue in the laboratory afterwards. This helps one to establish in his mind just how he can describe his findings.

One finds many ideas crystallized on paper as regards that rather evasive "Pathology of Shock" and nervous changes that have to be dealt with in patients following trauma.

The critical and accurate statements are unbiased and many questions are soundly answered. The whole volume is a wealth of accurate detailed observations and explanations without padding. Pathology of Trauma is one volume that should be on the bookshelf of a widely read medical man that has an enquiring mind.

Functional Pathology. L. Lichtwitz. 567 pp., illust. $12.50. Macmillan, Toronto, 1942.

Here is an unusual book and a valuable one. As Dr. Lichtwitz explains in his preface, functional pathology is the science which analyzes the body mechanism of signs and symptoms of disease. It provides what is often, in the clinician's mind, a missing link between the clinical sign and the pathological phenomenon producing it. Thus, the exophthalmos, the warm, moist skin, the tachycardia, the gastro-intestinal disturbances and the dental caries of Graves' disease emerge as integral parts of a disease which, though primary to the thyroid, affects every organ, gland and tissue of the body. The author is a physician in the broadest sense. In the chapters on the regulation of blood pressure, and essential hypertension, he draws on a clinical experience ripened not only in the consulting room and laboratory, but by the readings of both ancients and moderns, and by the kind of thinking a man can only do seriously and alone.

After a discussion of the endocrines, their interdependence and their relations with the chromaffin and sympathetic systems, the author goes on to consider heat regulation, metabolism and body water. The mechanism of body defense leads to discussions on arthritis, gout, obesity and disorders of the skeleton. Angina pectoris appears in a chapter with migraine, linked through their angiospastic nature. Diseases of the blood, kidney and liver have a place. There are many case reports to illustrate physiological and pathological, as well as clinical findings.

The book makes no pretense at being a complete study of functional pathology, and the reader may look in vain for discussion on some condition of particular interest to him. Furthermore, he may question some of Dr. Lichtwitz's best reasoned conclusions. This is what the author hopes for. Beyond its rich store of original information, this book is thought-provoking and stimulating.

Clinical Cardiology. W. Dressler. 660 pp., illust. $7.50. P. B. Hoeber, Inc., New York, 1942.

The book is timely and authoritative and very helpful. It is a book on bedside diagnosis. It stresses the eyes and ears and fingers as instruments of precision. While there is a short chapter on Electrocardiography, and another short chapter on Roentgenological Examination, and while there are frequent references in the text to electrocardiographic tracings and x-ray contours, these are not features of the book. The author states that his book is not exhaustive. It strikes one as quite exhaustive within the limits laid down.

The chapter on "The Physiology of Heart Failure" is concise and flows naturally into the succeeding chapter on "Clinical Manifestations of Heart Failure". Clinical methods of demonstrating left or right ventricular hypertrophy are excellently described, and some of the methods used must be new to many—"silent" mitral stenosis, "aneurysm" of the left auricle, the too frequent finding of Austin Flint murmurs, the interpretation of the venous pulse in the neck, and the frequency and recognition of tricuspid regurgitation and of pulsations in the liver—all stand out somewhat in a work which is uniformly complete and very readable. There is an economy of words and a clear, even if slightly pedantic, style that will be much appreciated.

A feature of the book is an addendum of "Important Points to Remember". Common errors are pointed out here, as well as the significance of outstanding signs. There are two hundred and ninety-four of these "points". This might strain the ordinary memory somewhat, but these aphorisms are tritely stated and useful.

Dermatologic Therapy in General Practice. M. R. Sulzberger and J. Wolf. 2nd ed., 632 pp., illust. $5.00. Year Book Publishers, Chicago, Ill., 1942.

This textbook is an exceedingly practical guide, especially suited for the general practitioner. The authors have clarified some parts that were ambiguous in the first edition. In addition, there is a short outline of the massive dose therapy of syphilis, and a discussion of the use and abuse of sulfonamides in dermatology. The chief virtue of the book is its extreme practicability. Such things as methods of keeping dressings in place on the scalp, chin, leg, foot, hand, etc., are well illustrated. It is not intended to be an atlas of rare diseases, but it does fulfil a practical need for the busy general practitioner and dermatologist.

Shock Treatment in Psychiatry. L. Jessner and V. G. Ryan. 149 pp. $5.25. Macmillan, 1942.

This manual is a collection and organization of most of the accepted facts to date pertinent to the actual use of insulin, metrazol (cardiazol) or electric shock therapies. It would be useful to physicians taking clinical instruction in these subjects. The reviewer is of the opinion that this timely, but not indispensable, treatise would be popular except for the price quoted.

Captain G. E. Halpenny

H. F. Skinner

Captain G. E. Halpenny, our Managing Director, is with the armed forces stationed in Ottawa.

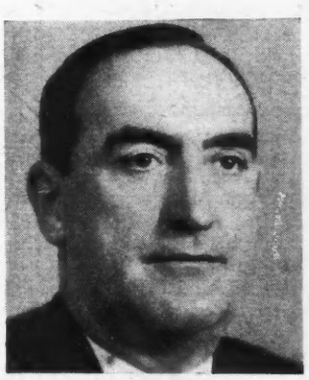
Gordon Gray who has been with us for the past 10 years has assumed Captain Halpenny's duties while he is on leave of absence.

Harold Skinner, who has been District Supervisor with headquarters in Vancouver, B.C., reports for service with the armed forces in January.

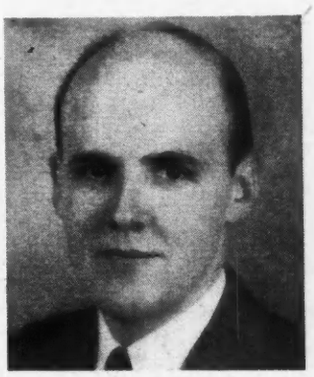
Several other representatives have gone on active service and rather than temporarily replace them, the S.M.A.—Biochemical Division and the Wyeth Division have been consolidated.

Angus R. Matheson, will make his headquarters in Vancouver, B.C., for the duration, as Director of Medical Services for Western Canada.

Frank O. Bauman remains in Walkerville, Ont., as Director of Medical Services for Eastern Canada.



A. R. Matheson



G. Gray

F. O. Bauman

JOHN WYETH & BROTHER (CANADA) LIMITED

Walkerville, Ontario

Stedman's Practical Medical Dictionary. S. T. Garber. 15th ed., 1257 pp., illust. $7.50. Univ. of Toronto Press, Toronto, 1942.

A medical dictionary is probably more needed nowadays than ever before. It is comforting therefore to have a perfectly fresh edition of Stedman's. Attention has been paid to the type and the general appearance is pleasing and convenient. Much new material has been added, in keeping with the great increase in terms in such fields as the vitamins and chemotherapy. Diphthongs have been dropped, and in the spelling of sulphur and the sulphur compounds the "ph" has been replaced by "f".

We have nothing but praise for a work which is as well prepared as it is indispensable.

The Natural Development of the Child. A. H. Bowley. 172 pp., illust. $2.50. Macmillan, Toronto, 1942.

In this book the author presents a concise review of the development of the child with special emphasis on intellectual, emotional and social development as related to the physical growth process. The book is divided into four general parts dealing with infancy, the pre-school period, the middle years of childhood and adolescence. For each of these age periods there is presented a brief statement of the normal developmental process as well as the commoner behaviour problems and habit disorders, with a summary of the accepted methods of treatment as employed in a child guidance clinic. Numerous brief case histories are used to illustrate the main points of emphasis and help to clarify the present day approach to the treatment of personality maladjustments in children and adolescents.

The Pleuro-Subpleural Zone. J. Skadal. 103 pp. $3.00. Macmillan, Toronto, 1942.

In this monograph a new approach to physical examination of the chest is described and discussed. The new approach consists in auscultating the chest during and following a sudden expiration. The author presents evidence to show that auscultation following sudden expiration increases the threshold of audibility of adventitious sounds, and sometimes discloses a peculiar reduplicated expiratory sound. He attempts, by argument and example, to show that the method of sudden expiration is useful in the differentiation of pleural and pulmonary disease. Long and somewhat confusing discussions of the so-called cortico-pleural syndrome scattered throughout the text make the monograph difficult to read and hard to evaluate.

Ambassadors in White. C. M. Wilson. 372 pp., illust. $3.50. Henry Holt, New York, 1942.

On two counts at least this is a notable book. It presents for the first time the complete story of medicine in the American tropics. And, in the spirit of the time, it is an eloquent and reasoned appeal for the co-operation of all the nations of the Western Hemisphere in matters of health, a plea for what Mr. Sumner Welles recently called "the human defence" of this hemisphere. The vital and important part of the book is a masterly survey of Latin-American medical and health problems, of the situation in the countries to the south of us arising from conditions of life and nutrition, to which the author gives the apt phrase of "a sick man's society".

Against this background there is told the truly tremendous story of the men who have made effective contributions in the struggle against disease in the American tropics. These are the "Ambassadors in White". Some are well known—William Gorgas and his epic work in sanitary engineering, Walter Reed and his associates, Carlos Finlay, of Cuba, and his work on yellow fever. Others will be new names to most readers —Dr. William Deeks, the Canadian-born McGill graduate who proved himself a great clinician and administrator in tropical medicine, the group of brilliant medical men associated with the medical division of the United Fruit Company. The story of Noguchi's work in tropical disease is vividly told.

Mr. Wilson has written a book which is broadly conceived and written with a fine sense of history, a remarkable grasp of medical realities and the driving urge of human and international needs and values.

The book is a healthy antidote to the many flatulent and metaphysical treatises which are presently being written on the present world-crisis and the post-war world. Although it deals mainly with the broad frontiers of medicine, it sets out in practical terms the economic, social and administrative problems of our western hemisphere and the approach to the solution of these problems. It is a book which is of immediate value to medical men and thoughtful statesmen alike.

Psychotherapy in Medical Practice. M. Levine. 320 pp. $3.50. Macmillan, Toronto, 1942.

In recent years the general practitioner has become increasingly aware of the importance of using psychotherapeutic methods in the treatment of many patients. This book which is written essentially for the general practitioner outlines very clearly the types of psychotherapy which can be readily used by every physician. In a discussion of the common misconceptions with reference to mental disorders the author deals with such questions as the hereditary factor in mental disease, the notion that psychoses are caused by overwork, the idea that marriage may cure all varieties of mental disturbance and the impression that bromides are always mild and safe to use. Of special interest are chapters on suicide risks and sex and marriage in which many practical therapeutic suggestions are made. This book should be of real help to the physician who in his everyday practice is so frequently confronted with problems which require psychotherapy.

Doctor's Simplex System. Prepared by A. Callaway. $3.00. Macmillan, Toronto, 1942.

This is a book which has been specially prepared by Mr. A. Callaway, formerly of the Department of National Revenue, to aid medical men in keeping an accurate and easily consulted record of professional income and expenditures. It is arranged to comply with the requirements of the Income Tax Act.

Each book contains enough pages to last for three years, and it also includes forms of annual statements which can be taken out and sent in to the Income Tax Inspectors.

The whole arrangement is extremely simple and clear, and should prove of very great assistance in the keeping of accounts.

BOOKS RECEIVED

Clinics. Vol. 1, No. 2. Edited by G. M. Piersol. Illust. $3.00. J. B. Lippincott, Montreal, 1942.

Military Neurosurgery. W. Penfield. 101 pp., illust. 50c. Government Distribution Office, Government Printing Bureau, Ottawa, 1941.

The British Encyclopædia of Medical Practice. 1941-42. Edited by Sir Humphry Rolleston. 431 pp., illust. Butterworth & Co., London, 1942.

The British Encyclopædia of Medical Practice Cumulative Supplement. Edited by Sir Humphry Rolleston. 288 pp., illust. Butterworth & Co., London, 1942.

Clinics. Vol. 1, No. 3. Edited by G. M. Piersol. 275 pp., illust. $3.00. J. B. Lippincott, Montreal, 1942.

Young People in the Courts of New York State. B. S. Alper. Legislative Document (1942) No. 55. 309 pp. Williams Press, Albany, 1942.

Solving School Health Problems. D. B. Nyswander. 377 pp. $2.00. Commonwealth Fund, N.Y., 1942.